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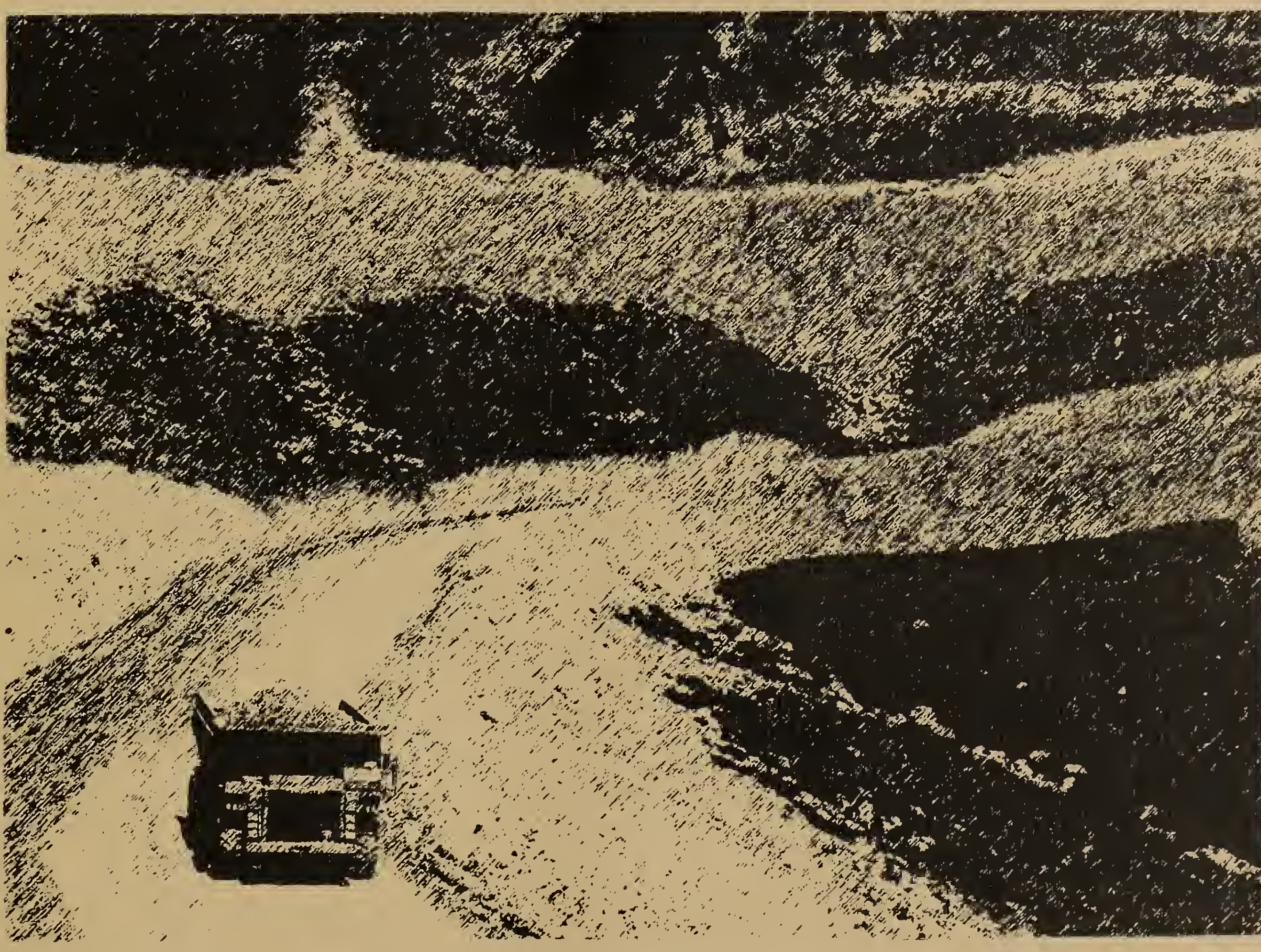
ENVIRONMENTAL IMPACT STATEMENT

BLACK PINE MINE EXPANSION PROJECT



USDA FOREST SERVICE
SAWTOOTH NATIONAL FOREST

October 1993

ERRATA

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Draft Environmental Impact Statement

Black Pine Mine Expansion

Cassia County, Idaho

Lead Agency: USDA Forest Service
Sawtooth National Forest
Burley Ranger District

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Abstract

This Environmental Impact Statement documents the analysis of the potential effects of implementing each of four alternatives for expansion of the Black Pine Mine on lands administered by Burley Ranger District of the Sawtooth National Forest in Cassia County, Idaho. The present condition of the environmental resources in the analysis area is documented and potential impacts to those resources as a result of implementing the alternatives are addressed. The alternatives are: (1) Proposed Action, (2) Proposed Action with Alternative Waste Dump Location, (3) Proposed Action with Alternative Haul Road, and (4) No Action.

Comments on this Draft EIS must be submitted to the Forest Supervisor by November 22, 1993.

Note To Reviewer

Reviewers should provide the Forest Service with their comments during the review period of the Draft Environmental Impact Statement. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the Final Environmental Impact Statement, thus avoiding undue delay in the decisionmaking process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions. **Vermont Yankee Nuclear Power Corp. v. NRDC**, 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the Final Environmental Impact Statement. **City of Angoon v. Hodel**, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the Draft Environmental Impact Statement should be specific and should address the adequacy of the statement and merits of the alternatives discussed (40 CFR 1503.3).

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Chapter 1

Purpose and Need

1.0 Purpose and Need

1.1 Introduction

Black Pine Mining Inc. (BPMI) plans to expand the existing gold mine operation at their Black Pine Mine property in Cassia County, Idaho. **Figure 1-1** shows the general location of the project. The USDA Forest Service is the lead agency for the preparation of this EIS which is designed to meet the requirements of the National Environmental Policy Act (NEPA). The Forest Service must comply with NEPA to evaluate the decision they must make regarding the mine expansion proposal. A Memorandum of Understanding (MOU) was signed between the Forest Service and BPMI. This MOU specifies that the Forest Service would supervise the preparation of this EIS and conduct the environmental review required by NEPA.

This EIS describes the existing environmental conditions in the project area and environmental consequences associated with implementation of the proposed expansion project and alternatives. The environmental analysis contained in this document has been conducted by an interdisciplinary team of specialists from the Forest Service, other involved agencies, BPMI, and Greystone (third-party consultant). All relevant physical, biological, economic, and social issues associated with the Forest Service decision have been considered. The analysis has been conducted on only those components of the mine expansion that are newly proposed and have not been evaluated in the previous EAs.

1.1.1 Background

In March 1991, an Environmental Assessment (EA) was prepared by the Forest Service which supplemented the original EA dated August 1988. The proposed expansion exceeds the scope of the previous EAs, thus requiring a new assessment of environmental impacts.

Black Pine Mining Inc. (a subsidiary of Pegasus Gold Corporation) purchased the rights to develop a cyanide heap leach/open pit gold operation from Noranda, Inc. in June 1990. Noranda submitted plans for the development of the mine in 1987. Environmental analysis was conducted on the proposal and the findings documented in an Environmental Assessment (EA). The decision to approve the Plan of Operations was documented in a Decision Notice and Finding of No Significant Impact (FONSI) dated August 4, 1988. However, the proposed action was not constructed by Noranda.

Revision 2 of the Plan of Operation was prepared and approved on August 7, 1989. The approved plan involved the development of three open pits, two heap leach pads, up to eight solution ponds, an ore haul road system, ore recovery facilities, and ancillary mining facilities with the ability to process approximately 11 million tons of gold ore. However, neither

Noranda nor BPMI constructed the project discussed in that revision.

BPMI adopted Noranda's approved operating plan when they acquired the rights to mine from Noranda in June 1990. BPMI then re-evaluated the approved mine development plan and submitted a revised operating plan - the Black Pine Project Plan of Operations, Revision 3, which was evaluated in an EA dated March 1991. The decision to allow the changes identified in the revised operating plan was documented in a Decision Notice and FONSI dated March 4, 1991.

Revision 3 involved a single 100-acre valley fill (composite) heap leaching facility capable of processing 22 million tons of ore and a new access road. Mining operations have been constructed and are currently being carried out by BPMI under operating plan number 01-91-02.

1.1.2 Proposed Action

BPMI's proposed supplement to the Plan of Operations is a modification of a plan originally proposed in 1992. This proposed supplement describes plans to mine three deposits from new pits, C/D Pit, E Pit, and J Pit. These pits and associated roads and dumps would disturb approximately 255 acres of Forest System lands. Ore from these deposits would be processed at the existing facilities on lands currently permitted and operated by BPMI. A total of 9.8 million tons of ore would be mined over approximately three years.

The development of the new pits would generate approximately 15.8 million tons of waste rock or overburden. This material would be partially backfilled in three pits and placed in one new waste dump. The new waste rock dump would impact approximately 33.8 acres of Forest System lands. Construction and use of haul roads would be necessary to connect the mine areas and waste dumps to the currently permitted roadway network. New roads would impact approximately 44.4 acres. Construction activities may involve the clearing of vegetation, the stockpiling and protection of salvageable topsoil, grading, drilling, blasting and hauling of material. **Table 1-1** identifies the proposed mine expansion components and their areas of disturbance. **Figure 1-2** illustrates the layout of the proposed and existing components.

The ore mined from these areas would be processed in the existing facilities at the mine. Haul roads are needed to transport ore and waste. Waste dumps are needed to dispose of waste materials generated from mining the new pits. This proposed expansion would extend the life of the mine for about three years, to about 1999.

All other components necessary for the proposed mine expansion are those that have been permitted prior to this mine expansion. The proposed action would extend the duration of mining operations at the Black Pine Mine for approximately

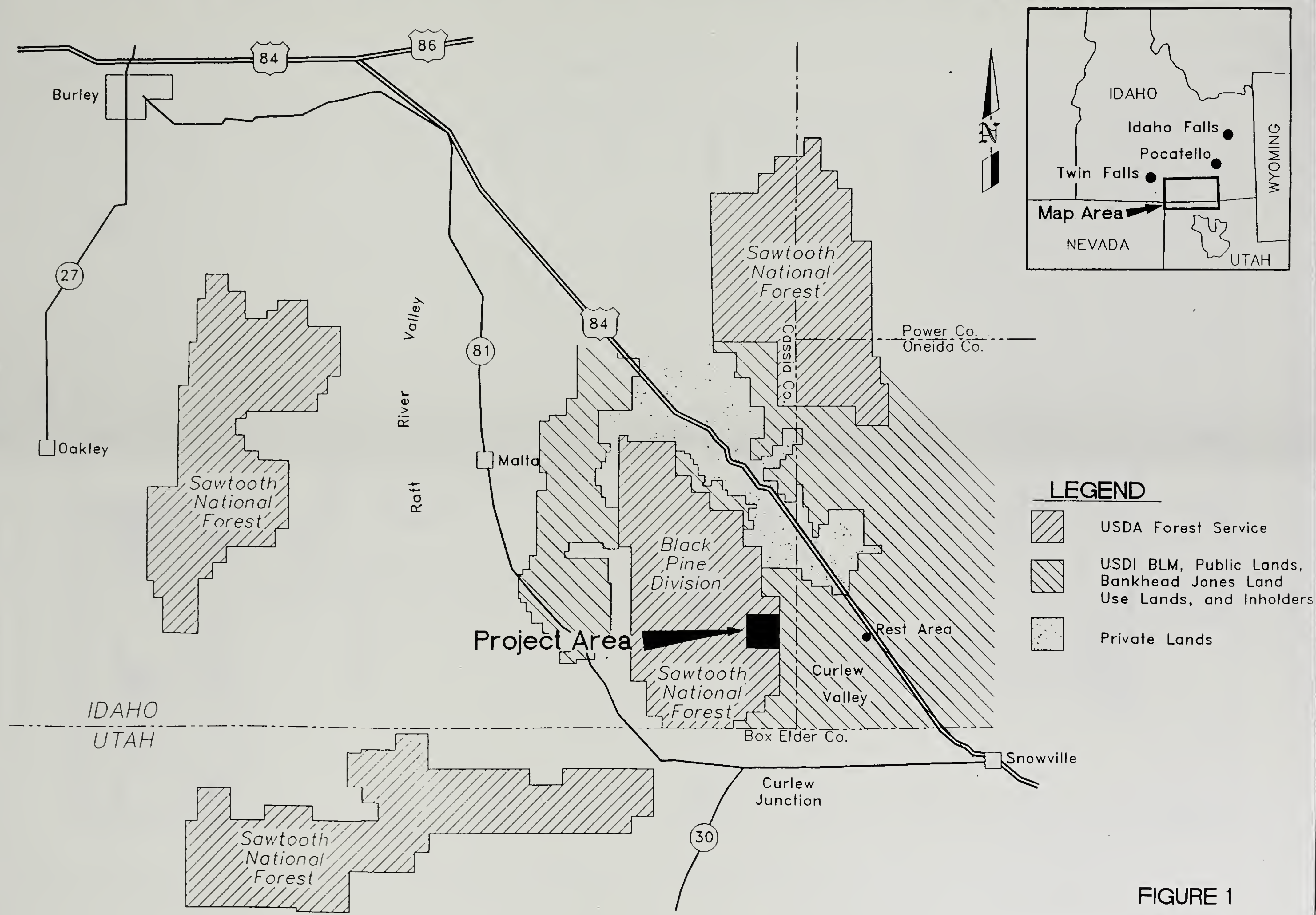
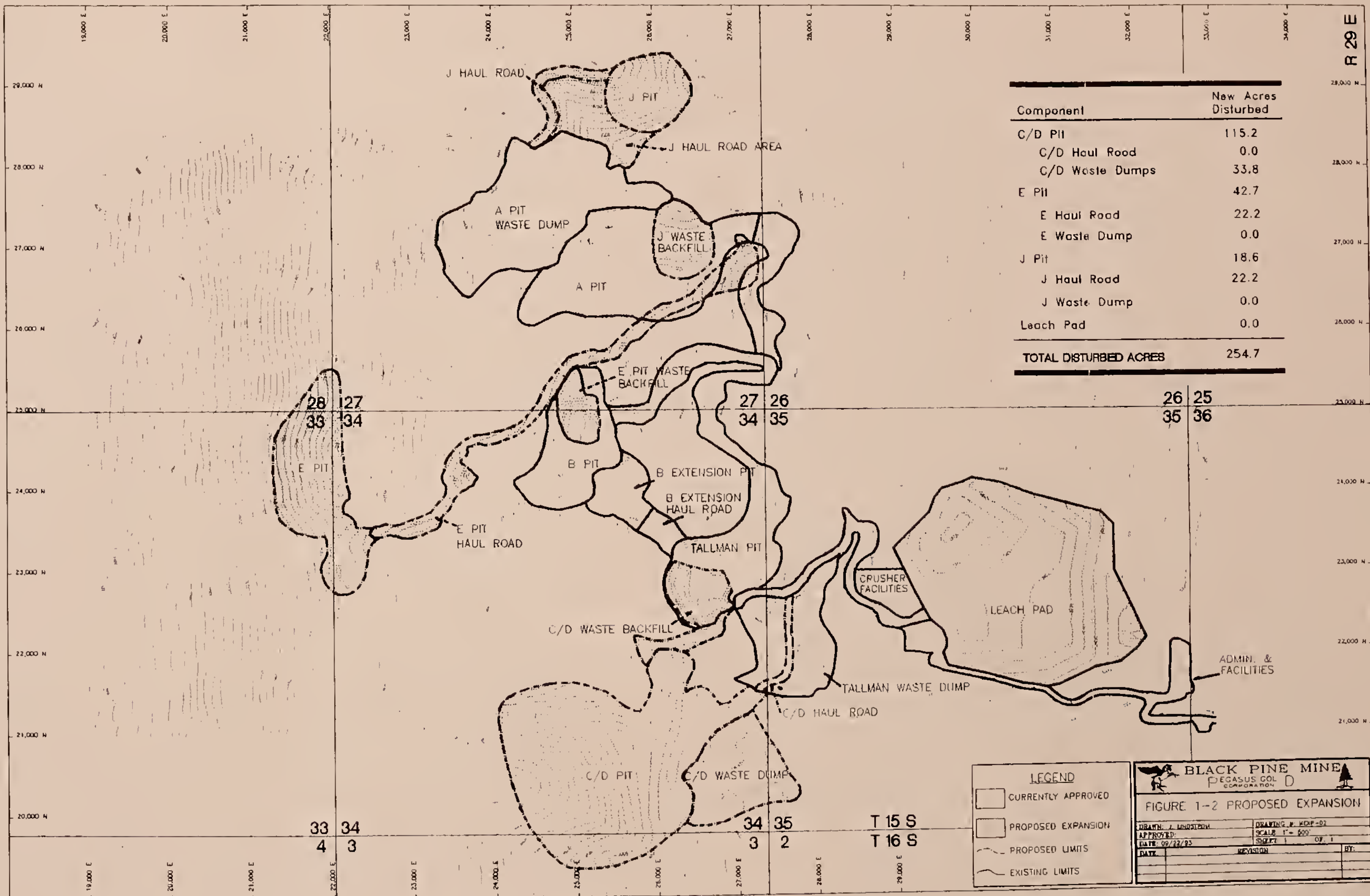


FIGURE 1

PROJECT LOCATION



Component	New Acres Disturbed
C/D Pit	115.2
C/D Haul Road	0.0
C/D Waste Dumps	33.8
E Pit	42.7
E Haul Road	22.2
E Waste Dump	0.0
J Pit	18.6
J Haul Road	22.2
J Waste Dump	0.0
Leach Pad	0.0
TOTAL DISTURBED ACRES	254.7

FIGURE 1-2 PROPOSED EXPANSION

Table 1-1 Proposed Components and Acres of Disturbance

Component	New Acres Disturbed
C/D Pit	115.2
C/D Haul Road	0.0
C/D Waste Dumps	33.8
E Pit	42.7
E Haul Road	22.2
E Waste Dump	0.0
J Pit	18.6
J Haul Road	22.2
J Waste Dump	0.0
Leach Pad	0.0
TOTAL DISTURBED ACRES	254.7

three years. It is estimated that the construction and operational workforce would remain at approximately 90 to 100 individuals for the remainder of the extended project life.

The development of the proposed mine expansion would include the following specific action on National Forest System lands:

1. Development of new deposits in C/D Pit, E Pit, and J Pit through open pit mining methods.

2. Development of mine waste dumps in existing pits (partial backfill of those pits) and a new location adjacent to C/D Pit.

3. Construction of haul roads necessary for the transport of ore and waste rock.

4. Raising the height of the existing leach pad by 50 feet to accommodate the increased volume of ore.

Of these actions, only a small portion of the southern end of the proposed C/D Pit would be located outside the area that has been evaluated previously for the existing mine. All other components of the expansion project occur within the existing study area.

The proposed plan also involves continued use of existing heap leaching facilities, process facilities, access routes, and other ancillary and support facilities currently approved in BPMI's active Plan of Operations.

1.2 Purpose and Need for Action

The purpose of this EIS is to document the environmental analysis of the proposed project and alternatives in accordance with the National Environmental Policy Act (NEPA). It also provides the decision-makers with information needed to make a project decision that is fully informed and relevant to the specifics of the project proposal. It documents and summarizes the process used to analyze the proposal and alternatives in order to identify the environmental impacts and subsequent mitigation measures associated with each.

The EIS process also provides a forum for public review and comment on BPMI's proposal, the associated relevant issues, and the environmental analysis.

Certain Federal laws encourage mineral exploration and development on Federal lands. Other Federal laws seek to minimize adverse environmental impacts and ensure long-term productivity of National Forest System lands. Some of the more prominent laws include:

- The 1872 General Mining Law and subsequent revisions which authorize, among other things, the exploration for and development of locatable minerals on National Forest System lands open to mineral entry.

- The 1897 Organic Act and subsequent revisions and the Mining Regulations at 36 CFR 228 which authorize the Forest Service to require Plans of Operation and regulate mining.

- The National Environmental Policy Act of 1969 (NEPA) which establishes the process all Federal Agencies must use to evaluate the impacts of federal decisions. Approval or modification of BPMI's Plan of Operations is guided in part by this Act.

This proposal shall also be in compliance with the Land and Resource Management Plan (Forest Plan) of the Sawtooth National Forest. The Forest Service has recognized that implementation of any of the action alternatives for this project would not meet the Visual Quality Objectives (VQOs) standards that have been designated in this area by the Forest Land and Resource Management Plan. Specifically, the recovery time specified for revegetation would not be met and the cumulative effect of adding the new proposed features to those associated with the existing project would not meet the designated VQOs in the long term. However, the Forest Plan has provisions for this situation. Therefore, this EIS will document these deviations from the VQO standards and the project's consistency with the Forest Plan.

BPMI has identified the need to expand in order to continue mining in an economical sequence. This will directly affect their ability to maintain their production goals. The proposed mining sequence is essential to allow for the mining of the higher grade ore from E Pit along with the lower grade ore from A Pit. The proposed sequence attempts to balance stripping ratio, ounces mined, and an optimum blend of ore grades going to the leach pad. This would optimize project economics, allow for maximum mining flexibility, and minimize the disturbed area.

1.3 Forest Service Decision Making Process

1.3.1 Decision To Be Made

Authority for the Forest Service to regulate mineral operations on National Forest

System lands is based on the 1897 Organic Act and described in regulations found in Title 36, Code of Federal Regulations, Part 228 (36 CFR 228). Under these regulations, the responsible officials must decide whether to:

1) approve a Plan of Operations which has been modified to prevent unnecessary and unreasonable resource damage;

2) approve a Plan of Operations which has been modified contingent upon additional mitigation measures; or

3) not approve a Plan of Operations that would not be able to comply with all applicable laws and regulations.

In addition to making the decision on the mining project, the responsible officials must document whether the project is consistent with the Forest Land and Resource Management Plan.

1.3.2 Environmental Analysis Process

Environmental impact statements are prepared to ensure that all relevant environmental information is available to public officials and citizens before decision are made and actions taken. In this sense, the BPMI EIS serves numerous state and federal agencies as well as the general public, by providing information about the project and the area affected.

Federal agencies, in particular, are required by the National Environmental Policy Act to make decisions which are based on an understanding of the environmental consequences of an action. For those federal agencies with jurisdiction by law, the BPMI EIS provides a full and fair discussion of significant environmental impacts and reasonable alternatives which would minimize adverse effects and enhance the quality of the human environment.

Implementation may be delayed on the Forest Service decision only if a permit is not granted or an appeal is filed within 45 days following publication of the decision.

1.3.3 Scoping and Public Review Process

Public involvement and review is an important part of scoping and the environmental analysis process. It ensures that the general public participates in the process and communicates their concerns so that these concerns are addressed in the mine expansion EIS. In addition, involvement by the local governments helps them anticipate the impacts and benefits which could occur from the mine expansion and make necessary plans and changes in public policy.

During the scoping phase, the public was requested to identify relevant issues, concerns, and opportunities. Scoping began on August 10, 1993. The public was asked to submit comments by September 10,

1993. Public comments will be considered throughout the analysis process. Public involvement throughout the scoping phase involved a number of activities:

- A mailing list was assembled.
- A Scoping Document was prepared and mailed to individuals, organizations, and government agencies on the mailing list.
- A Notice of Intent to prepare an EIS for the mine expansion was published in the Federal Register on August 10, 1993.
- A news release was published in the local newspapers and media describing the Scoping Document and its availability.
- An interagency and a public scoping meeting were conducted.

A public meeting was conducted by the Forest Service in Burley, Idaho. Nineteen people attended this public meeting held at the Burley Inn on August 24, 1993. The Forest Service explained the NEPA process and the importance of public involvement in the process to meeting participants. A slide show was presented explaining the scope of the proposed mine expansion. Most of the meeting participants were representatives of the Forest Service and BPMI. Two members of the public made statements regarding the project. An interagency scoping meeting was also held on September 16, 1993 for agencies affected by the proposal.

In addition to the verbal comments obtained at these meetings, citizens and government agencies submitted written comments to the Forest Service regarding the proposed mine expansion as part of the scoping process.

1.4 Issues

Through the scoping process described above, federal and state agencies, private individuals and organizations, and BPMI have raised a number of issues associated with the proposed mine expansion and its alternatives. These include potential adverse environmental effects, technical and engineering feasibility questions, and economic effect on BPMI and the surrounding communities. This process established the scope of the environmental analysis and indicated the resources of most concern to the public and agencies.

The Forest Service analyzed the comments, combined them with management concerns and public issues from previous planning efforts and developed a list of issues. The major issues that resulted are described below. Each issue is discussed in detail in **Chapter 3** and **4**.

1. Visual Quality

The proposed pits, dumps, and haul roads impact the visual quality of the Black Pine Mountains. The existing mine site is visible from Interstate 84. The mine

expansion will be visible from Interstate 84 and/or Utah Highway 30. Implementation of the project may be inconsistent with the VQOs identified for this area in the Forest Land and Resource Management Plan.

2. Public/Operator Safety

The construction of haul roads, pit excavation methods, waste dump construction, and temporary area closure boundaries affect public and operator safety.

3. Soil/Watershed

Disturbances associated with the construction of pits, dumps, and haul roads potentially increase surface erosion and affect watershed quality. The geochemical makeup of the waste rock in dumps could affect the quality of water that runs off and through the waste dump.

4. Reclamation Potential

The surface conditions at the mine site (side slope steepness, sparse vegetation, various soil conditions, dry climate, etc.) and type of disturbance (pit, dump or road) affects the standard of reclamation that can be expected to be successful.

5. Mine Economics

The location of the project components, the timing of approval, and the reclamation standards imposed, affect the economics of the mine. The mining operations affect the economies of the local communities (Malta, Burley, Snowville) and the State of Idaho.

6. Stability of Project Components

The location, construction and composition of the waste rock disposal areas, mine pit walls, and other components of the project may affect their stability.

7. Protection of Wildlife

The proposed pits, dumps, and haul roads would impact wildlife habitat.

1.5 Consistency with Other Permits and Approvals

There are federal, state, and local environmental permits and approvals which apply to the proposed mine expansion. The following list describes these primary environmental permits and approvals necessary for implementing the proposed mine expansion by major agencies. Additional approvals and permits also may be necessary during the life of the project. Other permits are associated with the operations of the permitted processing facilities, and may be necessary to continue operating.

1.5.1 Federal

- NEPA Compliance, Approval of EIS, Issuance of Record of Decision - Forest Service

- Plan of Operations Approval - Forest Service No. 01-91-02
- Consultation on Threatened and Endangered Species - U.S. Fish and Wildlife Service (USFWS) and National marine Fisheries Service
- Right-of-Way - Main Access Road Renewal - R.O.W. No. I-25666
- Cultural Resources Assessment Approval - Forest Service
- Cultural Resources Assessment Approval - State Historic Preservation Office (SHPO)

1.5.2 State

- Air Emissions Permit - IDHW-DEQ No. 0440-0018
- Reclamation Plan Approval - Idaho Department of Lands (IDL) No. RP-1086
- Cyanidation Permit - IDHW-DEQ No. CN-000020-3
- Operating Plan - IDWR - Permit No. D17-7132

1.5.3 County

- County Road Maintenance Agreement

Chapter 2

Alternatives Including the Proposed Action

2.0 Alternatives Including the Proposed Action

2.1 Introduction

Alternatives for the mine are somewhat limited. Locations of the mine expansion components are tied to the ore reserves which can be economically mined and processed. Various haul road routes, dump site locations, and the no action alternative have been selected for analysis in this Environmental Impact Statement.

Numerous components were evaluated and then alternatives were defined by selecting components (a pit, a haul road, and a waste dump site) in a combination designed to address specific issues. A brief overview of the selected alternatives is presented below. Detailed descriptions of these alternatives follow in this chapter.

It is important to note that the proposed expansion project would utilize facilities associated with the existing mining project. The existing processing and administrative facilities would be utilized along with all other ancillary facilities. Much of the existing haul road network would be used and previously mined pits would be used for some of the waste rock disposal. A possibility also exists that the Idaho Transportation Department may use some of the waste rock generated at the mine for their upcoming reconstruction of I-84 near the mine.

- **Alternative 1 - Proposed Action** includes C/D Pit, E Pit and J Pit, along with a haul road to E Pit and J Pit, and waste dumps for each pit. E Pit waste would be backfilled into B Pit. Part of the C/D waste would be backfilled into the existing Tallman Pit and part would be placed in a new waste dump east of the pit. J Pit waste would be backfilled into the approved A Pit.

- **Alternative 2** includes the same three pits but includes a C/D waste dump alternative.

- **Alternative 3** has a different road location to E Pit and a different E dump location, while all other components remain as in the proposed action.

- **Alternative 4** is the No Action Alternative which would allow the existing mine to continue operating as already approved.

Additional alternatives were considered but not selected because they did not meet certain evaluation criteria (Section 2.6). Therefore, they were not carried through further analysis. All alternatives are described in the following sections including those not selected for further analysis.

The description of mitigation measures for all alternative components is discussed in Section 2.7. Mitigation measures that are unique to each alternative are described in the respective descriptions for that alternative. These measures were designed to meet the post-mining objectives identified

by the Forest Service for this project (see **Appendix A**).

2.2 Alternative 1 - Proposed Action

BPMI has identified three additional areas containing economic mineral deposits through its ongoing exploration program. Development of these deposits would involve open pit mining and construction of associated haul roads and waste dumps. Existing facilities would be utilized to process the ore, but the height of the existing leach pad would be raised 50 feet.

The proposed action represents BPMI's amendments to their plan of operations for the expansion project. **Figure 1-2** shows the various components of Alternative 1.

The following describes the various components which have been combined to form Alternative 1 - Proposed Action. Some components of the proposed expansion would be the same for all alternatives (fixed components). Other components would vary depending on the alternative being considered (variable component). In all cases, the proposed pits are fixed, but haul roads to access the pits and waste dump sites would vary in location and impacts.

It must be noted that not all of the components described below would be active at the same time. Some of the components would be under construction while others were operating. Mining may only occur in one of the proposed pits at one time and the roads and waste dump for that pit would be the only active ones.

- **C/D Pit (fixed component)**

The proposed C/D Pit contains approximately 8 million tons of ore and 12 million tons of waste material. The location of the pit is southwest of the present Tallman Pit, at elevations similar to the Tallman Pit. It has a general alignment northwest to southeast. The pit would affect approximately 115.2 acres.

- **C/D Haul Road (fixed component)**

The proposed route would start from the existing haul road north of the existing Tallman waste dump and would cross approximately 1,500 feet of the approved Tallman waste dump. The remainder of the haul road would be constructed internal to the pit. The road would not affect any undisturbed area outside of the approved Tallman waste dump, the proposed C/D Pit, or the C/D waste dump.

- **C/D Waste Dumps (variable component)**

Two waste dump areas are proposed for waste material from the C/D Pit. One site to the north of C/D Pit would utilize the existing Tallman Pit and would partially backfill the Tallman Pit. The Tallman Pit would provide dump capacity for 5.0 million tons of material and would not disturb

any new areas. Access to this dump location would affect 5.3 acres.

A second dump site, directly east of C/D Pit, would accommodate the remainder of the material not used as backfill of the Tallman Pit (approximately 7.0 million tons). This eastern dump site would affect 28.5 acres.

- **E Pit (fixed component)**

The proposed E Pit contains approximately 1 million tons of ore and 2.2 million tons of waste material. The location of the pit is on the western slope and ridge top of Black Pine Cone with an alignment that is northwest to southeast. The pit area would affect a maximum of 42.7 acres.

- **E Pit Haul Road (variable component)**

The proposed route to E Pit is on the east side of Black Pine Mountain starting from the existing haul road at the east end of A Pit and crossing to the southwest just above the approved B Pit. This route uses as much of the present road system as possible without limiting the flexibility of mining operations. The proposed route is 6,490 feet long and would affect approximately 22.5 acres.

The proposed route also allows for waste from E Pit to be backfilled into the approved B Pit. Design of this route was constrained by the steepness of terrain, limitations of equipment, federal safety standards and the desire to utilize as much of the presently approved haul road as possible.

- **E Pit Waste Disposal (variable component)**

Waste material from E Pit would be used to partially backfill the approved B Pit, which would have sufficient capacity to accommodate all of the waste generated from the 42.7 acre E Pit. This component of the proposal would not create any new areas of disturbance and would avoid constructing a waste dump on the steep slopes near the E Pit.

- **J Pit (fixed component)**

The proposed J Pit contains approximately 0.8 million tons of ore and 1.6 million tons of waste material. The pit is located north of the approved A Pit, on the south facing slope of the Mineral Gulch drainage. The proposed pit would affect approximately 18.6 acres.

- **J Pit Haul Road Area (fixed component)**

The road to J Pit would start at the top of the A Waste Dump, proceed northward across the south-facing slope of Mineral Gulch, then turn to the east to reach the pit. The road would be relocated to lower elevations as mining in the pit progresses to lower benches. As much as practical, the road would be constructed internal to the pit, and mined out as the pit progresses. The proposed road would affect 22.2 acres.

- **J Pit Waste Disposal (variable component)**

The waste material from J Pit would be used to partially backfill the lower part of the eastern portion of the approved A Pit. This proposed component would not disturb any new acreage.

- **Leach Pad (fixed component)**

It is proposed to increase the height of approved leach heap by 50 feet. The proposed increase in height of the approved leach pad would accommodate the additional 9.8 million tons of ore reserves from the proposed pits.

The existing leach pad covers approximately 100 acres and was designed to accommodate about 22 million tons of ore in five separate operating cells. Included in the design is a composite liner system, a cross-valley solution retention embankment, and a leak detection and monitoring system. The pad contains a maximum 8 percent foundation and was designed for 100 to 150 foot heights when stacked at 2H:1V composite slopes on the sides of the pad.

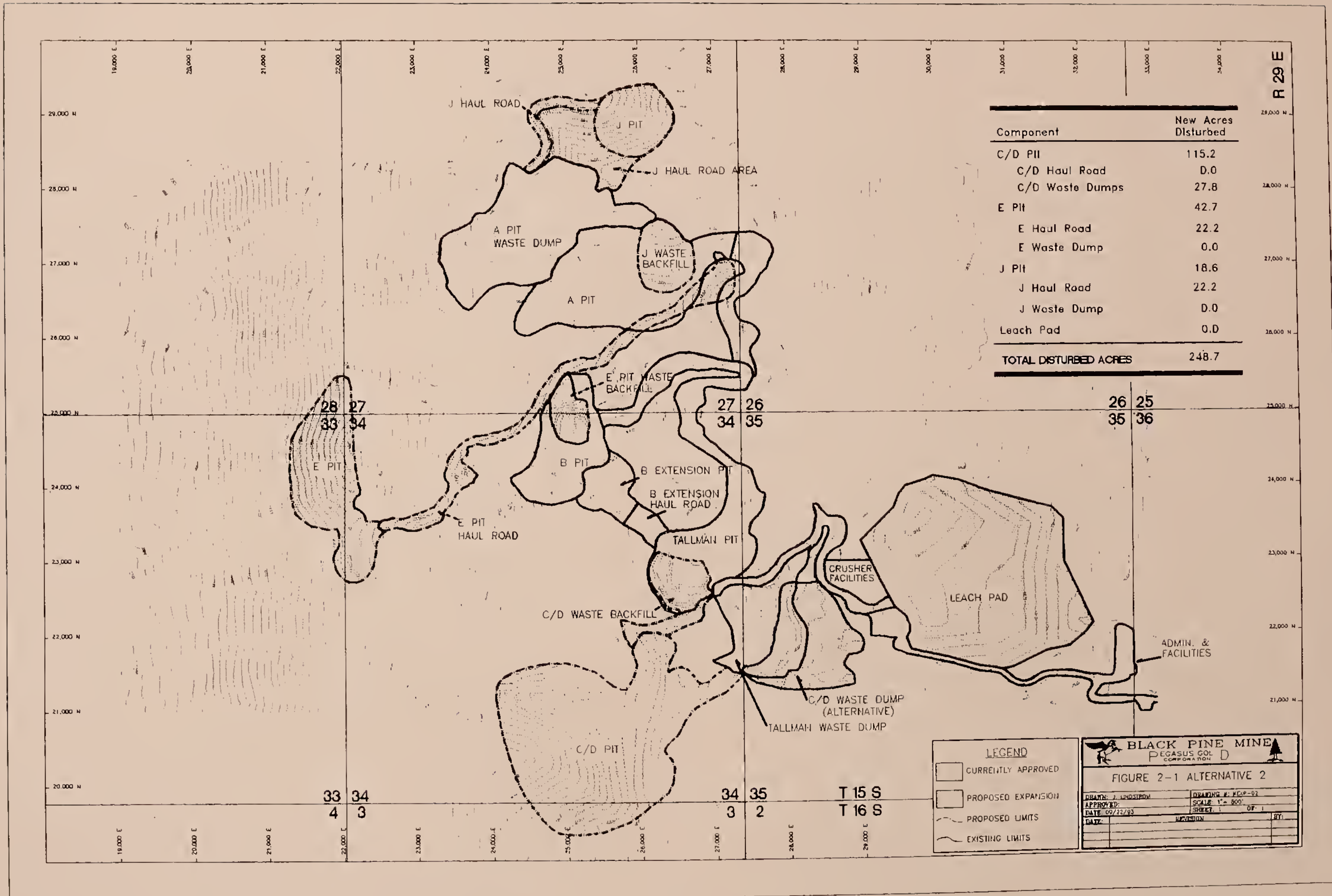
BPMI consulted with Golder Associates, the engineering firm who designed the original valley fill leach pad, to determine if adding 50 feet in height to the pad (total height of 150-200 feet) is within the design capabilities. Golder's preliminary assessment determined that the additional height and increased capacity would be within the design capabilities of the existing pad. Confirmation of this would be conducted by utilizing compression testing to confirm the integrity of the existing liner system, modeling the additional ore capacity for leach solution balance and control, and conducting slope stability models to ensure that pad slopes and solution retention embankment slopes met or exceeded regulatory requirements.

The proposed sequence attempts to blend ore grades going to the leach pad in order to optimize project economics, allow for maximum mining flexibility, and minimize the disturbance areas.

2.3 Alternative 2

This alternative is similar to Alternative 1 - Proposed Action, but involves an alternate location for the C/D waste dump by extending the existing Tallman dump. This alternative is illustrated in **Figure 2-1**.

Under this alternative, part of the C/D waste would be backfilled into the Tallman Pit, as in the proposed action. The remainder would be hauled to the existing Tallman waste dump and placed on the east face of the dump. Placing the C/D waste in this location would increase the disturbed acreage for the Tallman dump by approximately 22.6 acres. No new haul road construction would be necessary to haul waste to the Tallman dump.



Component	New Acres Disturbed
C/D Pit	115.2
C/D Haul Road	0.0
C/D Waste Dumps	27.8
E Pit	42.7
E Haul Road	22.2
E Waste Dump	0.0
J Pit	18.6
J Haul Road	22.2
J Waste Dump	0.0
Leach Pad	0.0
TOTAL DISTURBED ACRES	248.7

2.4 Alternative 3

This alternative is similar to Alternative 1 - Proposed Action, but involves a different location for the haul road to E Pit and a change in location for the disposal of Pit E waste. This alternative is illustrated in **Figure 2-2.**

The haul road to E Pit under Alternative 3 would follow the same route as in the proposed action from the processing facilities up to a point east of A Pit. At that point, the road would cross through A Pit and across the top of A waste dump. New construction would be required for a distance of 6,900 feet (including one switchback) to the southwest as the road rises to reach E Pit. Approximately 22.5 acres would be disturbed by the new road construction.

The E waste in this alternative would be backfilled in the west end of A Pit just below the switchback in the haul road. There would be sufficient capacity here for all waste generated by E Pit.

The use of A Pit as part of the E haul road and as a dump location for E waste, however, is a time constrained alternative. As mining progresses in A Pit, operations will eventually mine out the access road to E Pit. At the same time A Pit would need to be mined to a given depth in order to provide sufficient space for the waste from E Pit. This presents a small window of opportunity for this alternative. Any combination of changes (delays caused by permitting, weather, changes in reserves, costs, etc.) could accelerate the mining in A Pit, eliminating the access roads, or conversely slow the mining rate in A Pit, thereby restricting the dump space available.

2.5 Alternative 4 - No Action

The No Action alternative would mean that the Forest Service would not approve the revision to the Plan of Operations which would allow the Black Pine Mine to expand the mined area. BPMI would continue operating under their approved Plan of Operations. The mine site would then be reclaimed according to the approved reclamation plan.

2.6 Alternatives Considered But Not Selected for Analysis

The ID Team evaluated numerous alternatives, but several were not considered for further analysis for various reasons. Part of the evaluation procedure involved reviewing the rationale for alternatives. Four criteria were established and if any alternatives failed one or more criteria that alternative was eliminated. The criteria were:

A) Does it meet the environmental objective of minimizing impacts to surface resources with a minimum of long-term maintenance?

B) Does it create different or larger environmental impacts than the Alternative 1 - Proposed Action?

C) Is it technically feasible?

D) Is it economically feasible?

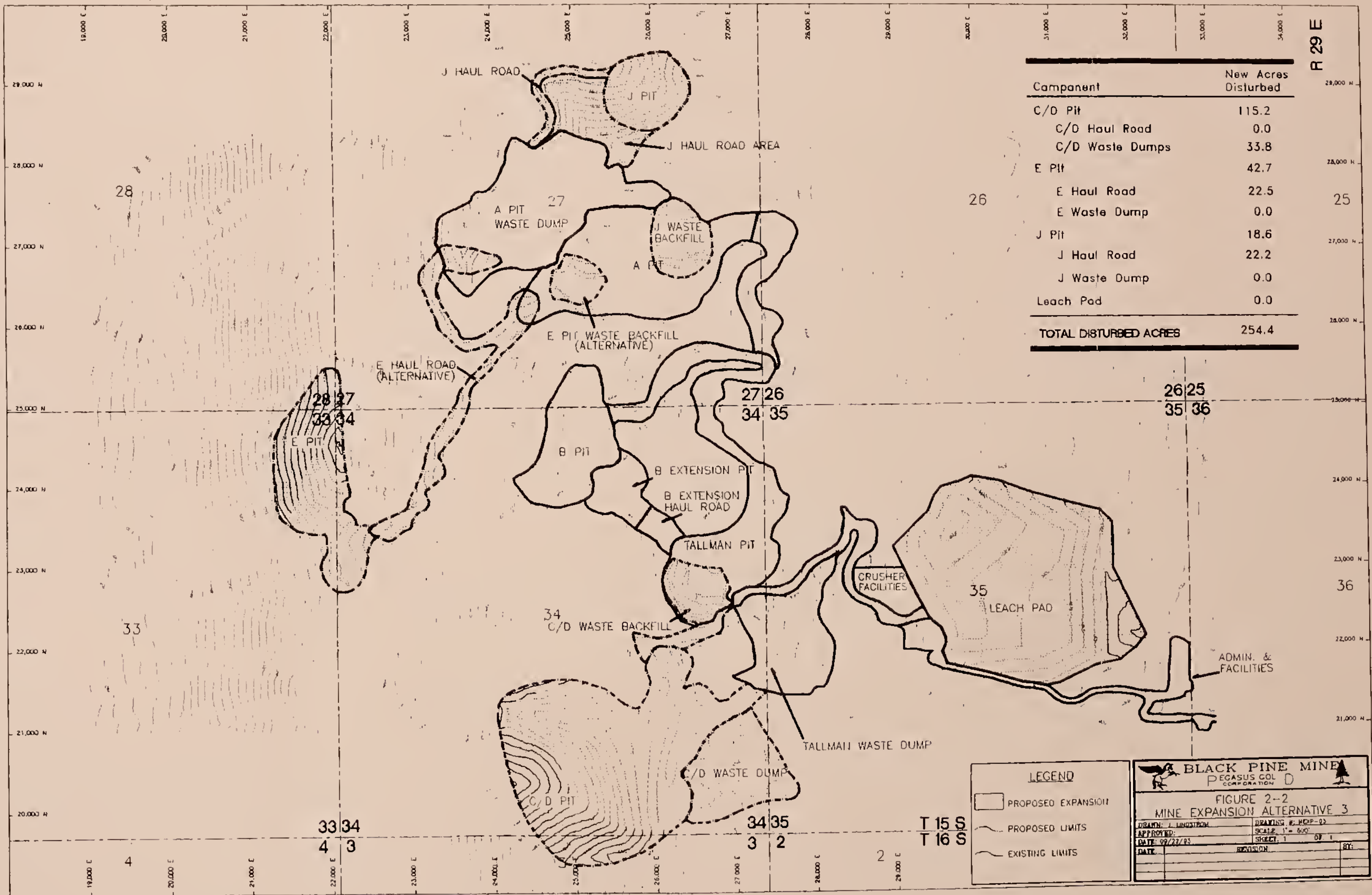
The following alternatives were eliminated from detailed analysis in this EIS:

- Construct a haul road from B Pit to E Pit. This alternative haul road was considered in order to minimize haul road disturbance and thus, visual intrusion. However, no real advantage was realized because the road would require two switchbacks to climb the steep terrain to E Pit, thus increasing the amount of disturbance and volumes of materials to be cut and filled. The cut and fill slopes would also create short-term visual effects. The increased road construction costs would have negatively affected mine economics. This alternative was not selected because it did not meet evaluation criteria A), B), and possibly D).

- Construct a waste dump for E Pit located immediately west of E Pit. This alternative was considered to eliminate the visual impact of another waste dump on the east side of the mountains. The location was eliminated because the steep terrain did not allow a stability safety factor great enough to comply with Forest Service guidelines. This alternative was eliminated because it failed criteria C).

- Construct the haul road to E Pit partially on the west slope of the mountains and locate the E Pit waste dump as a valley fill above the A waste dump. Also construct an alternative access road to J Pit that crossed Mineral Gulch northeast of A Pit then climbed the south-facing slope of Mineral Gulch to reach J Pit from the east. This alternative was considered to minimize visual intrusion on the eastern Black Pine Range. The haul road would cross the A waste dump and then proceed to climb to the top of the ridge by means of a switchback directly west of the A waste dump. After the road reached the top of the ridge, it would be constructed on the west side of the ridge line in a southerly direction to reach the E Pit. Waste rock from E Pit would be placed in an angle of repose dump immediately above the west end of the A waste dump and would fill the valley extending to the southwest. This alternative was not selected because it failed criteria A, B, and C.

- Do not use any C/D waste as backfill in the Tallman Pit; instead place all C/D waste in a single dump east of C/D Pit. This alternative was considered to avoid disturbing 5.3 acres necessary to access the Tallman Pit from C/D Pit. However, waste volume calculations indicated that placing all waste in the dump east of the C/D Pit would enlarge that dump by more than 5.3 acres of new disturbance. This



Component	New Acres Disturbed
C/D Pit	115.2
C/D Haul Road	0.0
C/D Waste Dumps	33.8
E Pit	42.7
E Haul Road	22.5
E Waste Dump	0.0
J Pit	18.6
J Haul Road	22.2
J Waste Dump	0.0
Leach Pad	0.0
TOTAL DISTURBED ACRES	254.4

alternative was eliminated because it failed criteria B).

- Construct a second leach pad. This alternative was considered to avoid raising the height of the existing pad. This alternative was dropped because it failed criteria A, B, and D.

2.7 Mitigation

The following mitigation measures are presently employed or would be implemented as an integral part of the proposed mine expansion, and would be common to all alternatives except the No Action alternative. Those measures that are currently being implemented at the mine are documented in the previous NEPA documents that have been prepared for the existing project. Additional mitigation measures specific to certain alternatives will be presented in the discussion of those alternatives in this chapter. Mitigation measures were designed to protect resources and address specific resource issues, as indicated in the following list:

Visual Quality Mitigation

- The leach pad, roads and waste dumps would be shaped to reduce their geometrical shape and blend their appearance into the surrounding landscape. Slopes of the reclaimed leach pad and the eastern C/D Waste Dump would be 3H:1V composite or continuous slope. Reclaimed roads would be returned to as near original contour as practicable.

- Revegetation species with similar characteristics to adjacent communities would be used to minimize the contrast in color and create wildlife habitat.

- Site reclamation would be concurrent with the progression of mining.

- Final reclamation is expected to achieve the Forest Land and Resource Management Plan standards but may not be complete on all sites within the time specified to meet the Partial Retention VQO.

Winter Mining Mitigation

- No snow or ice would be incorporated into fill areas that would decrease slope stability.

- If snow removal is necessary, then specific locations would be designated as snow dump areas.

- If exposed areas at the mine site would not be used during the winter, then temporary sedimentation control techniques would be installed in the late fall (silt fences, straw mulching, matting, netting, etc.) in order to prevent sedimentation during snowmelt in the spring.

Soil/Watershed Mitigation

- Available topsoil (growth medium) would be salvaged from all disturbed areas with slopes less than 40 percent where practical, and redistributed prior to revegetation.

- Soil stockpiles would be revegetated temporarily during operations. Available topsoil (growth medium) would be respread on affected areas prior to being revegetated.

- A soils analysis would be conducted following redistribution of salvaged soils, and amendments would be added as needed.

- Surface erosion would be minimized during operations by the implementation of a water management plan approved by the Forest Service. The water management plan would require maintaining existing waterways and providing appropriate drainage controls including buffer areas, drains, berms, settling ponds, and other measures. These structures would be installed prior to construction where needed to prevent runon and runoff from mine facilities and to reduce infiltration.

- Reclaimed slopes would be shaped to ensure slope stability and minimize soil erosion. The leach pad and the eastern C/D waste dump would have their outslopes reduced to 3H:1V or flatter.

Reclamation Potential Mitigation

- The different ecological complexes (landform, soil, vegetation combination) on site will have different seed mixes developed for revegetation. Six ecological complexes have been identified on the site:

    1. alluvial fan, east sloping, above 5900 msl;
    2. weakly dissected fluvial slopes, north sloping, conifers;
    3. ridgelines and upper slopes, low vegetation cover;
    4. steep fluvial slopes, outcrops;
    5. middle fluvial slopes (10-60%); and
    6. drainage bottoms, gentle slopes, deep soils.

- Topsoil (growth medium) and revegetation would be handled as described in the preceding Soil/Watershed section. Final revegetation would use a combination of non-native and native species to achieve post-mining objectives of simulating the composition and levels of productivity of surrounding vegetation.

- Ground cover would be returned to a minimum of 75 percent as much cover as adjacent areas.

- Water facilities constructed for the mine would be available as a future opportunity for wildlife and livestock use following project completion.

Mine Economics Mitigation

- No additional labor force is needed for the expansion project. The majority of the existing work force at the mine has been hired locally to reduce negative impacts while increasing benefits to local communities.

- Compensation for any lost animal unit months (AUM) resulting from expansion implementation would be made directly to grazing permittees.

Project Component Stability Mitigation

- For each waste dump, stability was addressed in one of two ways: (1) the face of the dump would be graded to 3H:1V composite or continuous slope at completion and this would maximize stability of the dump, or (2) the waste dump would be backfilled inside a mine pit and this would eliminate concern regarding stability.

Wildlife Mitigation

- Revegetation of disturbed areas would use plant species compatible with wildlife habitat needs, to the extent possible, in relation to the ecological complex where the disturbance occurs.

- The leach pad would continue to be fenced to keep large and small mammals out, but fences would not be located so as to inhibit migratory movements of deer.

- BPMI would maintain the existing wildlife pond that has been established as a water source for local wildlife.

- BPMI would maintain their policy that firearms are prohibited in the mine area.

- Road access to the site similar to premining conditions would be provided after mining ceases.

- Water facilities constructed for the mine would be available as a future opportunity for wildlife and livestock use following project completion.

- Wildlife impact monitoring of the area would continue under the Memorandum of Understanding (MOU) between the Forest Service, Idaho Department of Fish and Game, and BPMI using the HEP procedure.

- Habitat Units (HUs) lost by implementation of the expansion project (as defined by the HEP analysis) would be replaced by BPMI on a one for one basis.

Air Quality Mitigation

- The approved Idaho air permit would have to be amended for the expansion project to reflect new project conditions.

Cultural Resource Mitigation

- No significant cultural resources have been identified that would be impacted by the expansion. If any resources are discovered in the area of disturbance, they would be protected until they could be evaluated.

2.8 Comparison of Selected Alternatives

Table 2-1 presents a relative comparison of project alternatives for the issues that have been identified for the project. The table compares numbers whenever effects can be quantified and provides text to compare effects which cannot be quantified. Expanded impact discussion is provided in Chapter 4.

Table 2-1
Relative Comparison of Proposed Action and Project Alternatives

Issue	Alternative 1 (Proposed Action)	Alternative 2	Alternative 3	Alternative 4 (No Action)
Visual Quality	Some mine expansion project components would be visible from the highway during operation. Most noticeable would be the C/D Pit and dump and the E-Pit haul road. The C/D Pit and the reclaimed areas would not meet the standards for the Partial Retention VQO but would meet the standards of the next lowest VQO (Modification). This is consistent with the Forest Plan.	Some mine expansion project components would be visible from the highway during operation. The northern part of the E-Pit haul road would be less visible than Alternative 1. The C/D Pit and the reclaimed areas would not meet the standards for the Partial Retention VQO but would meet the standards of the next lowest VQO (Modification). This is consistent with the Forest Plan.	Some mine expansion project components would be visible from the highway during operation. The visual impact of the C/D Pit and dump area would be less than Alternative 1 because waste would be consolidated in the existing Tallman dump area. The C/D Pit and the reclaimed areas would not meet the standards for the Partial Retention VQO but would meet the standards of the next lowest VQO (Modification). This is consistent with the Forest Plan.	No new visual impacts beyond those associated with the existing mine would occur.
Public/Operator Safety	The area closure boundary would be expanded to prevent interaction between the public and mining operations.	Same as Alternative 1	Same as Alternative 1	The existing closure boundary would be maintained.
Soils and Watershed	254.7 acres would be disturbed resulting in a potential increase in erosion of 61 tons/yr. Geochemical analysis of waste rock indicates low potential for acid or metals generation in runoff exposed to waste rock or pit walls.	248.7 acres would be disturbed resulting in a potential increase in erosion of 60 tons/yr. Geochemical analysis of waste rock indicates low potential for acid or metals generation in runoff exposed to waste rock or pit walls.	254.4 acres would be disturbed resulting in a potential increase in erosion of 61 tons/yr. Geochemical analysis of waste rock indicates low potential for acid or metals generation in runoff exposed to waste rock or pit walls.	No additional disturbance beyond that already approved would occur.
Reclamation Potential	Of 254.7 acres disturbed, 78 acres would be revegetated (haul roads and dumps).	Of 248.7 acres disturbed, 72 acres would be revegetated (haul roads and dumps).	Of 254.4 acres disturbed, 73 acres would be revegetated (haul roads and dumps).	No additional disturbance beyond that already approved would occur.
Mine Economics	Current employment levels (approximately 85) would increase slightly and be extended about 3 years to about 1999.	Same as Alternative 1	Same as Alternative 1	The life of the existing mine would not be extended 3 years.
Stability of Project Components	Pits, haul roads, dumps, and the leach pad expansion would be designed to meet federal and state standards.	Same as Alternative 1	Same as Alternative 1	No new facilities would be constructed.
Wildlife	A total of 151.22 habitat units (HUs) would be lost for the five indicator species that were evaluated. No T&E species would be affected.	A total of 143.66 habitat units (HUs) would be lost for the five indicator species that were evaluated. No T&E species would be affected.	A total of 152.52 habitat units (HUs) would be lost for the five indicator species that were evaluated. No T&E species would be affected.	No additional HUs would be lost beyond those affected by the existing mine.

Chapter 3

Affected Environment

3.0 Affected Environment

This chapter describes the affected environment for the proposed Black Pine mine expansion and alternatives. The affected environment is the portion of the existing environment that could be impacted by the proposed action. It consists of physical, biological, social, and economic components. The information contained in this chapter was developed to focus on issues identified through the scoping process and interdisciplinary analysis.

3.1 Physical Environmental

The following sections discuss geology, soils, hydrology, climate and air quality within the proposed mine expansion project area.

3.1.1 Geology

The Black Pine Range is located along the northeastern limit of the Basin and Range province. This province is characterized by dissected fault block mountains rising above arid intermountain valleys. The Black Pine Range is composed of Devonian to Permian Age sedimentary rocks. In the Black Pine mining district (proposed mine expansion area) the surface and subsurface strata consist of limestone, siltstone, quartzitic sandstones, and shales. These rock units have been intensively deformed by folding and faulting.

The existing Black Pine Mines are located near the historic Tallman mine. Precious metal mineralization is hosted in Pennsylvanian to Permian Age sediments, predominately limestones and siltstones. Mineralization was initially identified in three separate areas where the Tallman, A Pit and B Pit are now located. Continued geologic exploration has identified three additional mineral deposits including the proposed C/D Pit, E Pit, and J Pit. Structural ground preparation (faulting/fracturing) in combination with preferred rock types (limestones and siltstones) appears to be the dominant factors in localizing gold mineralization at the Black Pine Mine.

Finely divided gold (micron-sized) particles and minor pyrite are the principal metallic minerals. Native gold grains are disseminated in limestones and siltstones. Some gold is associated with organic carbon in both the limestone and siltstone rock types.

Geochemistry

A geochemical evaluation of the ore/waste rock characteristics has been performed. The geochemical investigations focused on the acid-generating and metal-leachability of both ore and waste rock.

The static test most frequently used to determine the acid-producing potential of a material is acid-base accounting (ABA) (Sobek et al 1978). An ABA test determines the forms of sulfur present in a material, including sulfide-sulfur. All of the sulfide present is assumed to be pyrite,

which would provide a worst-case assessment of acid generating potential. The maximum acid potential (AP) is determined assuming all pyrite will weather and produce acid. Similarly, the neutralization potential (NP) determines the amount of acid a material can neutralize by measuring the acidity consumed during a titration procedure.

Both the AP and NP are converted to tons $CaCO_3$/1000 tons (T) material. The AP is then subtracted from the NP to yield and ABA (and lime rate). An ABA value of less than -20 T $CaCO_3$/1000 T represents a net acid-producing material, while a value greater than 20 T $CaCO_3$/1000 T represents a net neutralizing material. Values between -20 and 20 are uncertain and may require further kinetic testing (British Columbia Acid Rock Drainage Task Force 1990). Finally, a most conservative estimate of the acid-producing potential of material is based on a comparison of the NP:AP ratio. A material is considered to have the potential to form acid if the NP:AP is less than 3 (British Columbia Acid Rock Drainage Task Force (1990).

Samples of seven drill holes were evaluated for acid-base accounting and EPA Method 1312 leachability characterization. A total of 17 samples were selected to be representative of lithologies to be encountered during the mining of B Pit and E Pit. Because of host rock and structural similarities the proposed C/D pit and J Pit are assumed to have similar ABA values to B Pit. The ore hosts in the B Pit and proposed C/D Pit and J Pit occur in the same Pennsylvanian to Permian Age formation whose lithology consists of limestone and silty limestone. Alteration and oxidation mineral suites (iron oxides) and gangue minerals (calcite and quartz) suggest the three mineral deposits are genetically related. Similar complex structural deformational styles (folding and faulting) underscore the relationships between B Pit and proposed C/D and J Pits.

Table 3-1 identifies the sample location, depth, and ABA value. All samples have very little AP and are strongly neutralizing (Schafer & Associates 1992). With the exception of a single ore sample with an ABA of 19, all samples have ABA values ranging from 291 to 905. The mean values for ore and waste are 446 and 590 respectively. The low total sulfur (pyrite) values, abundance of limestone, calcareous siltstone, and pervasive calcite veins in the mine area results in a negligible potential for acid generation from any of the mined materials (Schafer & Associates 1992).

3.1.2 Soils

The general soil types in the project area have been identified by past Forest Service surveys. **Figure 3-1** shows the relative locations of the soil types. A description of the relevant characteristics of each soil type that may be impacted by the proposed pits, haul roads, and waste dump are described below.

The soils in the proposed E Pit and E Pit haul road are primarily composed of Mapping Unit 412-1SG. Portions of the Alter-

Table 3-1
Acid Base Accounting and Metal Solubility of Samples from Proposed Expansion Pits

Location/ Sample No.	Depth (ft)	ABA	Metal Solubility (EPA Method 1312)											
			As	Cd	Cu	Fe	Hg	Mn	Ni	Pb	Se	Zn	Ca	Mg
B Pit														
BP-90-29	50-60	720	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	5.6	6.03
BP-90-29	70-80	515	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	0.002	7.81	2.01
BP-90-31	60-70	613	<0.049	<0.002	<0.003	0.026	<0.002	<0.001	<0.014	<0.031	<0.055	0.006	7.16	1.44
BP-90-31	110-120	640	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	9.89	0.822
BP-90-31	160-165	558	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	10.3	0.92
BP-90-33	95-105	769	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	0.005	5.61	4.13
BP-90-33	105-115	580	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	6.65	2.59
E Pit														
92BP-078	185	618	0.040	0.003	0.004	0.015	0.0002	0.005	0.010	0.041	0.064	0.009	6.59	0.899
92BP-078	220	566	0.040	0.003	0.004	0.030	0.0002	0.005	0.010	0.041	0.064	0.009	5.96	0.707
92BP-081	55	294	0.040	0.004	0.004	0.041	0.0002	0.005	0.010	0.041	0.064	0.010	5.34	0.951
92BP-081	90	905	0.040	0.003	0.004	0.021	0.0002	0.005	0.010	0.041	0.064	0.008	4.72	3.550
92BP-081	145	705	0.040	0.003	0.004	0.009	0.0002	0.005	0.010	0.041	0.064	0.005	5.90	0.504
92BP-082	25	291	0.040	0.003	0.004	0.019	0.0002	0.005	0.010	0.041	0.064	0.009	6.94	2.070
92BP-082	125	729	0.129	0.003	0.011	0.072	0.0002	0.005	0.012	0.041	0.064	0.010	7.24	5.670
92BP-082	175	19	0.145	0.003	0.004	1.970	0.0008	0.016	0.010	0.041	0.064	0.143	5.74	0.749
92BP-088	30	296	0.040	0.003	0.004	0.014	0.0002	0.005	0.010	0.041	0.064	0.007	5.86	1.030
92BP-088	125	701	0.040	0.003	0.004	0.012	0.0002	0.005	0.010	0.041	0.064	0.009	6.27	0.580

native E haul road, C/D Pit, C/D waste dump, J Pit, and J haul road occur on Mapping Unit 415-1J. The proposed J haul road also may impact soils in the Mapping Unit 414-1C.

Mapping Unit 412-1SG is composed of 55 percent Argic Calciorthids, 20 percent Lithic Calciorthids and small areas of Pachic Argiborolls, Typic Haplaborolls, and Lithic Haplaborolls.

Mapping Unit 415-1J is composed of 60 percent Argic Calciorthids, and 30 percent Calcixerollic Duriagids.

Mapping Unit 414-1C is composed of 55 percent Pachic Argiborolls and 25 percent Argic Pachic Cryoborolls.

Argic Calciorthids are deep, well drained soils formed in colluvium and alluvium from marine limestone. Topsoil has a gravelly loam texture and is from 0 to 6 inches thick. Depth to bedrock is generally greater than 40 inches. Permeability is moderate and the potential for erosion from surface flow is low to moderate.

Lithic Calciorthids are shallow and well drained. Typical topsoil depth is 0 to 6 inches. The soil has a gravelly loam texture. Depth to bedrock is approximately 20 inches. Permeability is moderate to moderately high, and the potential for surface erosion from surface flow is moderately high.

Calcixerollic Duriargids are a deep, well drained soil formed in colluvium and alluvium from marine limestone. Topsoil depth is from 0 to 5 inches deep, and has a clay loam texture. Permeability is moderate and the potential for erosion from surface flow is low to moderate.

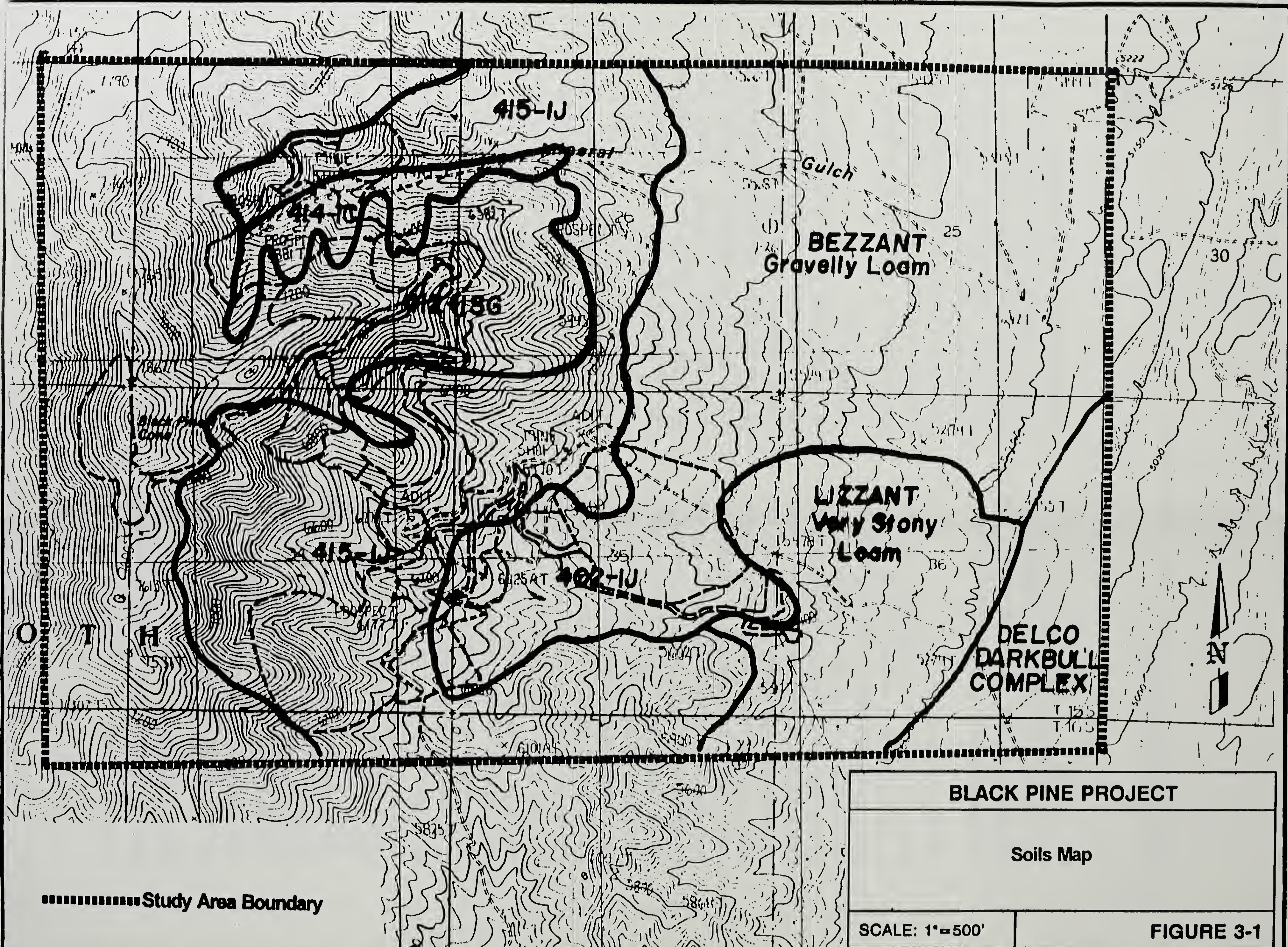
Pachic Argiborolls are deep, well drained soils formed in colluvium and residuum from marine limestone. Topsoil varies in depth from 0 to 10 inches and has a loam texture. Permeability is moderate and the potential for erosion from surface flow is moderate.

Argic Pachic Cryoborolls are a deep, well drained soil. They are characterized by a surface layer of organic matter about eight inches thick. Permeability is moderate and the potential for erosion from surface flow is moderate.

3.1.3 Hydrology

Surface Water Hydrology

The project area including the existing Black Pine Mine is located in the headwaters of the Great Salt Lake Basin. The area is characterized by three distinct landforms. The uppermost landform consists of the mountains in which the existing mine is located. This landform setting is characterized by relatively steep slopes and well defined channels. The intermediate landform consists of a series of three shore-line benches which were created by ancient Lake Bonneville. Alluvial fans are associated with the channels in the uppermost portion of this setting. The third and lowermost landform com-



BLACK PINE PROJECT	
Soils Map	
SCALE: 1"=500'	FIGURE 3-1

prises the valley floor or historic bottom of Lake Bonneville.

There are no perennial or intermittent streams in the project area. Although mountain channels are well defined, they show little sign of active runoff. Channel bottoms are generally rounded and well vegetated. Channels making the transition from the mountain landform through the alluvial fans to the first bench of the intermediate landform generally remain defined for only a short distance after which they lose definition. This loss of definition indicates that storm runoff is characterized by low flows and low velocities. The low velocities result from the relatively flat benches in the area. Storm water originating above the upper bench concentrates and forms new channels across the crest of the bench. These new channels are well developed between the crest and the toe of the bench (due to head cutting from a change in slope), but lose definition shortly after encountering the lower slopes of the next bench. This sequence is repeated at each bench level as well as in the transition between the bench district and the valley floor. In each of the cases identified above, storm runoff rapidly dissipates on the surface of the lower bench or valley floor. Once dissipated, storm runoff is lost to infiltration and evapotranspiration and does not continue downstream for any appreciable distance.

Surface flow from the existing mine site is generally in an easterly, radial pattern into the valley. This flow occurs only during springs snow melt and periods of severe or sustained thunderstorms that occur in the summer months.

There are several ephemeral drainages in the area, which flow primarily only during storm events. The most significant of them is Mineral Gulch which drains the northern portion of the existing mine area. The proposed J Pit and J haul road would affect surface runoff into Mineral Gulch. The approved A Pit and A waste dump are also located in this drainage. No gauging records are available for Mineral Gulch, however, no sustained flows of significance have been observed by local resource management agencies. No defined natural drainage channel for the gulch exists from the mountain areas to the valley floor. The channel loses definition as it moves from steeper to flatter areas.

The Hazel Pine channel, is well defined at the mine site but becomes undefined within the upper portions of the first bench below the mountain alluvial fan. Several additional undefined channels are located within the middle bench, lower bench, and valley areas. The approved B Pit and haul road are located in the Hazel Pine drainage.

The proposed E Pit would be located primarily on the upper, west facing slopes of Black Pine Canyon on the southwest side of the Black Pine range. The slopes which form Black Pine Canyon are relatively steep with a well defined channel at the bottom. However, the channels in the canyon do not flow water except in direct

response to a storm event. No perennial or intermittent streams have been identified within Black Pine Canyon.

Historically, the main channel emanating from Black Pine Canyon has been diverted into an abandoned ditch within the upper bench areas of Curlew Valley. The ditch within these flatter areas has filled in with sediments to the point that it has breached in many locations resulting in the discharge of canyon storm water on to the relatively flat benches located south and east of the canyon mouth. This flat area is typical of those areas found east of the existing mine where no well defined channels are located, and where undefined flow rapidly disperses into sheet flow. It is expected that flows leaving Black Pine Canyon will follow the same flow patterns as identified for the other drainages discussed previously.

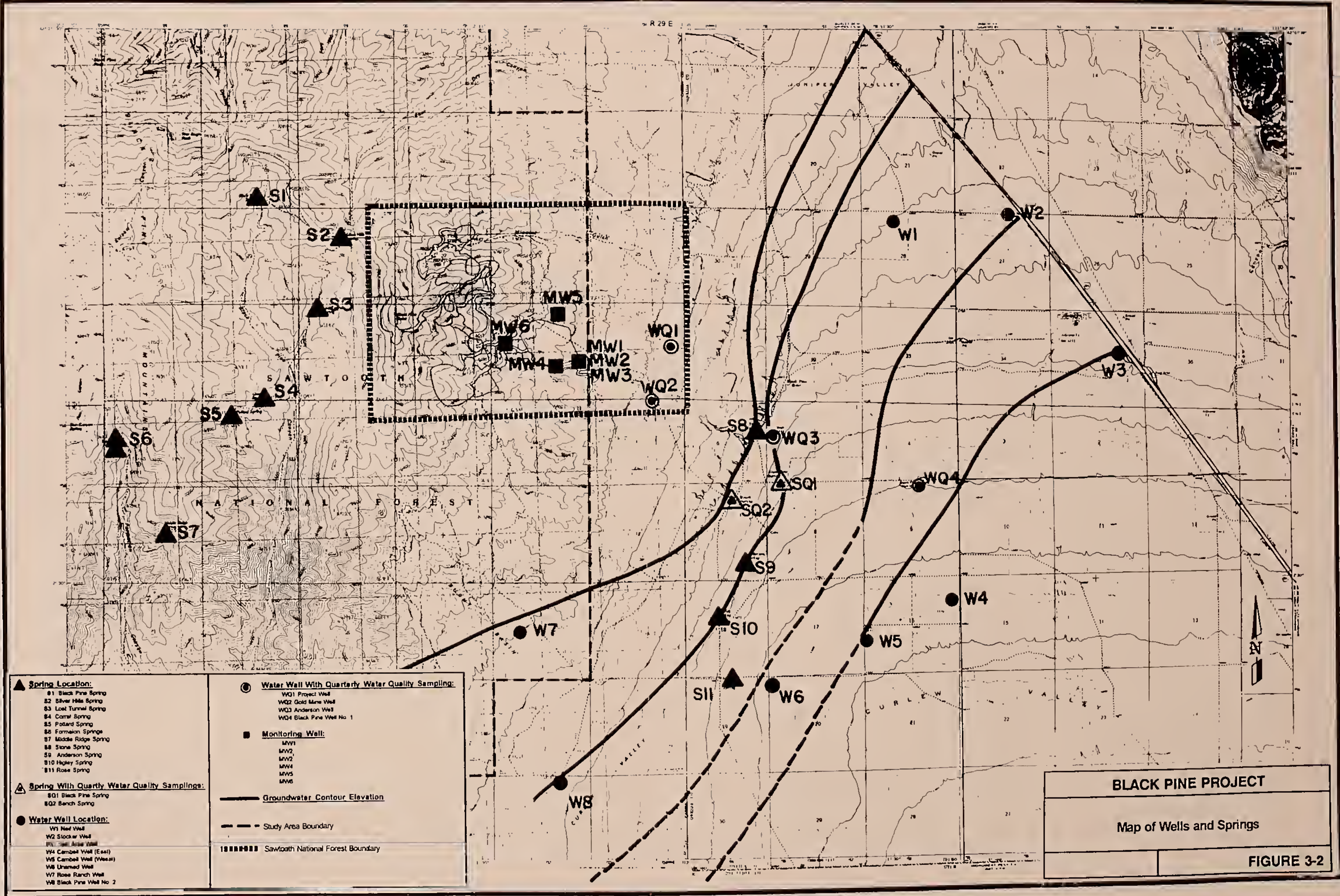
Surface water resources in the Curlew Valley east of the mine site are limited and consist mainly of several small springs and ephemeral streams (**Figure 3-2**). Springs in the area are a valuable resource given the semi-arid conditions and low availability of surface waters. Springs which lie southeast (downgradient) of the existing mine include Stone Springs, Black Pine Spring, Bench Spring, Anderson Spring, Higley Spring and Rose Spring. Data, collected since November 1990, indicate that flow from Black Springs is slightly less than two gallons per minute. The flow from Bench Springs averages slightly more than three gallons per minute. Where specific flow records are not available, flow is estimated to be similar. These wells are an important water supply for livestock and wildlife. Springs are discussed here and also in the groundwater section.

Two springs are being used to monitor potential contamination in groundwater. The mine site is located approximately two miles northwest and three benches above Black Pine and Bench Springs.

Black Pine Spring is located near the southwest corner of Section 5, Township 16 South, Range 30 East. The spring was developed for livestock watering. There are no well defined channels which move water from the mine area into the immediate area occupied by Black Pine Spring. Bench Spring located within the eastern half of Section 7, Township 16 South, Range 30 East, has been developed in a similar manner to Black Pine Spring. Other springs in the area which have not been developed as monitoring sites include Stone, Anderson, Higley, and Rose Springs.

Stone Spring is located within the northeast corner of Section 6, Township 16 South, Range 30 East, outside any drainages which are affected by the mine area. The spring does not discharge into any local drainage. The mine site (approximately three miles west) is located three benches above Stone Spring.

Anderson Spring (located in the southeast corner of Section 7, Township 16 South, Range 30 East) is fully developed for



BLACK PINE PROJECT

Map of Wells and Springs

FIGURE 3-2

irrigation and livestock and is not located within a defined channel. The spring lies within a flat basin below the paleo-shoreline benches.

Higley Spring is located near the center of Section 18, Township 16 South, Range 30 East, more than three miles south of the mine area.

Water quality for some of these springs has been monitored from 1991 to present by BPMI. The results of this monitoring effort have been summarized in a report of Groundwater and Surface Water Results - Black Pine Mine, as submitted to IDEQ. The water quality has remained within normal limits during the monitoring period.

Two springs are located within Black Pine Canyon on the west side of the Black Pine Range: the Lost Tunnel Spring and the Silver Hill Springs. Each spring is estimated to flow less than one half gallon per minute. The Lost Tunnel Spring, located in the northwest corner of Section 33, Township 15 South, Range 29 East, lies approximately 3/4 mile below the proposed E Pit location. Silver Hill Spring (located in the northern half of Section 28, Township 15 South, Range 29 East) has been developed for stock watering purposes.

Six sediment catch basins have been installed on the two major channels (Hazel-Pine drainage and Tallman drainage) which receive runoff water from the existing mine site. These include three dry dams in the Tallman drainage below the Tallman waste dump, a sediment catch basin immediately below the heap leach pad (M1 Pond), a dry dam immediately below the Tallman Dump, and a dry dam in the Hazel Pine drainage. All of the detention basins have been designed to detain a 10-year, 24-hour storm runoff event. Flows from the detention basins are controlled by discharge structures. These structures aid in both sediment control and dissipation of peak runoff energy.

Groundwater Hydrology

The project area is located on the northern extremity of the Great Salt Lake groundwater basin. All readily available groundwater information near the site was compiled and is summarized in the following sections. Particular emphasis is placed on defining the local groundwater hydrology and summarizing the available water quality data. Limited information was available for the mine site; therefore data from Curlew Valley was extrapolated to characterize the local hydrogeology.

The location of nearby wells, springs, seeps, and mine facilities are shown on **Figure 3-2**. Also included on **Figure 3-2** are groundwater elevations, well depths, and potentiometric contours developed from these data. Most wells identified in the area are between 200 and 600 feet deep. Wells located in the alluvial valley are approximately 500 feet deep and are generally deeper than wells located along the base of the Black Pine Mountains,

which are shallow, approximately 300 feet deep. Depths to water vary from 100 to 500 feet. The well with the shallowest to water depth (77 feet) is the Black Pine No. 1 well. The greatest depth to water is located in Section 14 (T16S, R29E) at 450 feet (the Rose Ranch well). The Black Pine No. 1 well is located in the alluvial valley east of the mine area and the Section 14 well is located just south of the mine area in Burnt Basin.

An exploration well was drilled to evaluate the groundwater potential near the mine site on July 21, 1988. The well is located in the southeast quarter of the northeast quarter of Section 36. The hole was lithologically logged and lithologic samples collected. The hole was geophysically logged and fitted with two piezometers in different water bearing zones (a piezometer is an instrument used to measure the fluctuation or pressure in the water table or can be used to measure the water pressure in the soil). The well was drilled to a total depth of 442 feet.

Static water levels were measured in both piezometers prior to pump testing. The static water level in the shallow piezometer was 150.9 feet below the ground surface at an elevation of approximately 4,974 feet. The static water level of the deeper piezometer was 156.7 feet below the surface at an elevation of approximately 4,968 feet. This indicates that the deeper aquifer has a pressure head of 5.8 feet.

The shallow aquifer was pumped for one hour. The aquifer would only produce about one-half to one gallon per minute. The deeper aquifer was pumped for six hours at a pumping rate of 10 gallons per minute. This was the maximum rate that could be pumped due to the small diameter of the piezometer (two inches) and the limited air capacity of the compressor.

Transmissivities were calculated from the drawdown versus time data. It is estimated that for short-term pumping (less than 100 minutes) a transmissivity of about 4,800 gallons per day per foot can be expected, and for long-term pumping, a transmissivity of about 560 gallons per day per foot can be expected.

A production well was drilled approximately 300 feet northeast of the exploration well. The surface elevation at the well site is approximately 5,123 feet. Well depth is approximately 400 feet with the test pump set at 310 feet. The well has 10-inch diameter casing.

Static water level at the production well was measured at 148 feet (elevation 4,975 feet). The pumping rate was raised above the 400 gpm rate, expected to be needed by BPMI for project start up. This rate of pumping was sustained through the seven days of testing.

The drawdown reached 9.25 feet below the static water level (elevation 4965.75 feet), or 157.25 feet below the ground surface level once the pump had developed maximum yield. The drawdown remained constant throughout the seven day test.

Within two minutes of turning off the pump, the down-well water level had recovered to 149.25 feet (elevation 4,973.75) and in less than one-half hour, the starting static level of 148 feet had been reached.

The production well water quality has been monitored since early 1991. Water quality is generally good and has remained stable over the past two years.

Groundwater recharge in this area appears to originate as precipitation and snow in the mountain areas. Groundwater from the site generally flows southeast into the Curlew Valley and then south towards the Great Salt Lake.

Exploration drilling in the mine and leach pad areas did not encounter any measurable groundwater at depths between 300 and 700 feet below the surface. The depth to water at the Goldmine well, the closest well to the mine site is 228 feet.

Potentiometric contours, shown on **Figure 3-2**, were drawn using the static water levels of the wells and spring elevations. Springs are considered to be surface expressions of local water tables. These contours tend to follow the topography dipping to the southeast. The regional direction of groundwater flow trends to the southeast from the mountainous areas toward the alluvial valleys and into the Great Salt Lake Basin.

Water level contours constructed by the Idaho Department of Water Administration (Chapman, 1972) and by the State of Utah Department of Natural Resources (Bolke, 1969) show similar contours and water level elevations as those shown on **Figure 3-2**. These and other points were used to construct the map for the Black Pine area.

The available well logs show water-bearing zones present in the gravel and clay beds of the alluvium. These beds are from one to 50 feet thick. Some of the well logs show water present in multiple zones. The only well that appeared to penetrate the alluvial sediments is in Section 14 (T16S, R29E). This well showed four feet of limestone at 200 feet and then alternating clay, gravels, limestone and sandstones. The water-bearing zone in this well is a clay and gravel layer at approximately 5000 feet elevation.

The sedimentary beds present under the site are fractured and folded. Any bedrock aquifer present is probably controlled by bedding planes, fractures, and folding of the sedimentary beds. The springs along the eastern base of the Black Pine Mountains occur in a rough line trending northeast-southwest and are possibly fracture controlled. Groundwater recharge in this area appears to originate as precipitation and snowmelt in the mountainous area.

The Goldmine Well and springs in the vicinity of the mine are primarily used for watering livestock. Most of these springs are located in the alluvial valley along the base of the Black Pine Mountains. The

Anderson Well, located in Section 5 (T16S, R30E) is used as an irrigation well for the Anderson Ranch. This well is located approximately two miles east of the mine.

Groundwater monitoring is being conducted on six monitoring wells (**Figure 3-2**) downstream of the existing leach pad on a quarterly basis. The monitoring began in the fourth quarter of 1991. This monitoring program detected no water in any of the wells.

Little current demand exists on the local groundwater resources, with domestic consumption and stock watering being the only usage. The Goldmine Well has an appropriated allotment of approximately 14 gpm, while the Anderson Well is estimated at less than 10 gpm. The springs in the area are relatively small and are estimated to flow at less than 10 gpm. Reported maximum yields from the wells in the valley vary considerably from a few gallons per minute up to 536 gpm, depending on the location and depth of the well. The Goldmine Well near the site was pumped at 60 gpm with a reported drawdown of 14 feet; however, the available drawdown is approximately 52 feet to the bottom of the well which would indicate the well could produce more than the tested rate. No information exists as to the actual zone of completion, although it is likely that the well penetrates the bedrock system a short distance. **Table 3-2** summarizes some physical data from area wells.

Groundwater quality data have been collected at a number of wells and springs in the area, the locations of which are shown on **Figure 3-2**. Groundwater quality samples were also taken from area springs and wells over 20 years ago. In 1970, the Idaho Department of Water Administration (Chapman, 1972), sampled two of the area wells. The Stocker Well is located five miles east of the site along Interstate 84 in Section 27, (T15S, R30E), **see Figure 3-2**. The other well is located approximately three miles northeast of the project site in Section 32 (T14S, R30E). The ground water quality results of these two wells is listed on **Table 3-4** along with the results found for samples taken at Bench Springs in 1967. These two wells are located in the alluvial valley distant from the mine site and the chemistry may not necessarily be representative of the groundwater present under the site. Dissolved constituents in groundwater generally increase with distance from mountain recharge sites. Bench Spring is located two to three miles from potential contamination sources downgradient of the proposed project site. The groundwater chemistry present at this spring could be a result of alluvial or bedrock sources or both.

Concentrations observed in recent samplings are generally consistent with those sampled in 1970 and 1967. This indicates that water quality has not changed over the past 20 years and that the existing project has not affected local groundwater quality.

Table 3-2
Summary of Well Information for Wells Near the Black Pine Mine

Well Name	Total Depth (ft below ground level)	Depth of Static Water Level (ft below ground level)	Well Yield (gpm)	Top of Aquifer (ft below ground level)	Water Use	Appropriated Allotment (gpm)
Project	422	150	ND	388	Mine use only, no domestic use	ND
Gold Mine	ND	228	60	ND	Livestock	14
Rose Ranch (Section 14)	ND	450	ND	ND	Livestock	ND
Black Pine No. 1	ND	77	ND	500	Livestock	ND
Black Pine No. 2	ND	~132	11-17	ND	Livestock	ND
Anderson	ND	~92	ND	ND	Irrigation, Livestock	estimated at < 10
Campbell West	ND	~150	ND	ND	Livestock	ND
Neil	ND	~178	ND	ND	Irrigation	ND
Stocker	ND	~215	370-540	ND	Livestock	ND
Rest Area	ND	~270	ND	ND	Domestic	ND

Source: Schafer & Assoc. and WEI 1993.
ND - No Data

Table 3-3
Chemical Analysis of Groundwater Samples

	Project Well 08/15/70	Gold Mine Well 06/24/92	Anderson Well 06/24/92	Black Pine Well #1 06/24/92	Maximum** Contaminant Level
Temp. (C)	18.6	17.2	13.7	16.4	*
pH (S.U.)	7.77	7.6	7.5	8.0	*
Conductivity (mS/cm)	0.414	0.463	0.669	0.493	*
TDS (calc) (mg/l)	218	247	369	260	Trend
Hardness as CaCO (mg/l)	182	200	275	207	
Chloride (mg/l)	34	35	81	51	250
Sulfate (mg/l)	13	21	47	18	250
Nitrate (mg/l)	0.42	0.35		0.41	10
Calcium (mg/l)	47	53	0.39	61	Trend
Magnesium (mg/l)	16	16	14	13	Trend
Sodium (mg/l)	14	18	29	19	Trend
Potassium (mg/l)	1.9	1.2	2.4	1.8	*
Fluoride (mg/l)	0.05	0.07	0.09	0.07	4.0
Arsenic (mg/l)	ND	ND	0.007	ND	0.05
Cyanide (weak & dissolvable)	ND	ND	ND	ND	0.2

ND = Not Detected
NA = Not Analyzed
* = No Established Standards
** = As specified in Idaho Cyanidation Permit (IDHW-DEQ No. CN-000020-3)

Table 3-4
Historic Groundwater Data

	Well In T14SR30E Sec 32 08/15/70	Stocker Well 08/15/70	Bench Springs 10/10/67
Temp.	58	58	55
pH SMCL	7.44	7.68	7.5
Specific Conductance (micromhos/cm @ 25°C)	587	801	504
TDS (ppm)	308	572	292
Hardness as CaCO (ppm)	234	203	202
Chloride	54	120	47
Sulfate	21	29	23
Nitrate	0.61	13.01	1.1
Calcium	58	69	50
Magnesium	24	38	19
Sodium	44	17	24
Potassium	3.1	7.8	1.2
Silica	17.5	57.0	15
Fluoride	0.11	0.12	0.3
Arsenic	ND	ND	NA

ND = Not Detected
NA = Not Analyzed

3.1.4 Climate and Air Quality

Climatology

The climate around the proposed project area varies from semi-arid in the valley to sub-humid at the higher elevations. Climatological data from the site are not available, so relevant information was collected from nearby stations at Strevell, Idaho and Snowville, Utah and extrapolated to the project site.

Information was obtained from the State Climatologist for Idaho and Utah, University of Idaho and Utah State University, Strevell and Snowville, respectively. Information for the period of record includes monthly and maximum daily precipitation and maximum, minimum, and mean daily temperatures by month. This information is summarized below.

Strevell, Idaho

	Monthly Precip.	Mean Monthly Max. Daily Temperature	Mean Monthly Min. Daily Temperature	Annual Precip.
Maximum	5.60	86	54	16.17
Minimum	0.00	31	16	5.49
Mean	0.94	57	33	11.23

Snowville, Utah

	Monthly Precip.	Mean Monthly Max. Daily Temperature	Mean Monthly Min. Daily Temperature	Annual Precip.
Maximum	4.44	90.5	49.4	-
Minimum	-	34.2	9.9	-
Mean	0.95	61.2	29.1	11.45

Snowville, Utah which is closest to and perhaps most representative of the existing mine site. Precipitation values for the project site were determined by adjusting the information from Strevell and Snowville stations based upon information in IDWR report "Water Resources of Western Oneida and Southern Power Counties, Idaho".

BPMI has collected precipitation data near the Tallman Pit since 1992. As shown below, precipitation totals have been quite variable over the 19-month monitoring period. 1992 was a very dry year, and 1993 started as a very wet year. This is the pattern similar to the entire northwest United States during this period.

Black Pine Mine Precipitation

	Precipitation	
Date	1992	1993
J	ND1	1.53
F	*0.53	1.2
M	0.46	2.61
A	1.06	1.52
M	0.65	1.16
J	1.06	2.73
J	0.32	1.67
A	0.75	
S	0.83	
O	2.01	
N	0.83	
D	0.93	
TOTAL	8.9	12.42

* Partial data for the month

The existing mine site is at an elevation of approximately 5,500 feet. The precipitation data for Strevell and Snowville were increased 36 percent and 25 percent respectively and averaged to estimate the precipitation at the site. The resulting annual precipitation is estimated to be 14.79 inches.

There are no records for the amount of snow cover that could be expected at the project site. The nearest snow survey site is at Sublett, Idaho, which is approximately 25 miles north and east of the site. Records from the SCS indicate that on April 1 (over the period of record 1961-1985) there has been approximately 35 inches of snow on the ground at Sublett, with a water equivalent of about 11 inches. No measurements were available for May 1 for the period of record 1961 through 1985.

Wind data collected at the Moberg Canyon Remote Automatic Weather Station (RAWS), located approximately eight miles to the southwest, appears to be the most representative of available meteorological databases in the project area. Predominant wind direction components at the Moberg Canyon site are south and northwest reflecting up and down valley flows induced by the alignment of the canyon itself. Air drainage flows at the Black Pine site, on the other hand, are expected to follow the eastward downsloping terrain and the northwest to southeast trending Juniper Valley.

Air Quality

The remote location of the Black Pine Mine affords the site very low background levels of air pollutants. The closest air quality monitoring, conducted by the State of Idaho at the Craters of the Moon National Monument, provides a good indication of background PM_{10} (particles with an aerodynamic diameter of 10 microns or less) levels for remote locations in the region that are not influenced by urban, industrial, or agricultural sources. Therefore, the data recorded at Crater of the Moon is considered by the Idaho DEC to be representative of background levels of PM_{10}. The State of Idaho ceased monitoring PM_{10} at the Craters in July 1989. The latest 1988 data showed the maximum 24-hour PM_{10} concentration was 20 $\mu g/m^3$ (micrograms per cubic meter), and the annual geometric mean was 14 $\mu g/m^3$. In lieu of measured data, the Idaho Department of Environmental Quality uses the following PM_{10} concentrations for rural Idaho: annual mean 30 $\mu g/m^3$; 24-hour mean 60 $\mu g/m^3$.

3.1.5 Visual Resources

The potential impact to visual resources resulting from development of the Black Pine expansion project has been identified as a significant issue. The existing Black Pine Mine is visible from Interstate 84 which runs essentially northwest and southeast approximately five miles east of the project site. The current visual quality of the area has been addressed in the Sawtooth National Forest System land and

Resource Management Plan and the BLM Management Framework Plan.

The project area is located within the Snake River Plain landscape character type which covers southern Idaho, northern Nevada, and northwestern Utah. It is characterized by broad stretches of flat to rolling semiarid plains interspersed with shallow to deep canyons, high elevation desert plateaus, and infrequent mountain ranges. Near the project site, the somewhat linear Black Pine Range is variable in appearance with strong dissections and forested sideslope patches on a predominantly sagebrush covered landscape.

The BLM lands in the area between the interstate highway and the mine site typically include the flat valley bottoms and low foothills. These have been classified as Low C Scenery Quality Class where textural and color contrasts are limited and often monotonous. It has also been given a Visual Resource Management Class of IV which relates to the lands' sensitivity level and distance zone. The existing access road to the mine is located on BLM lands.

The Black Pine Mountains are the dominant landscape feature in the area and are on lands managed by the Forest Service. The existing mine facilities are located on National Forest System lands and are visible from I-84. The three pits, waste rock dump, and haul roads proposed for the mine expansion are also on these lands. The Forest Land and Resource Management Plan has identified lands in the project area to be managed as part of a Scenic Travel Route for I-84. The management goal for this area is to provide a visually appealing landscape as viewed from the highway corridor. Mineral development in this area was considered in the Forest Land and Resource Management Plan and mining areas are to be reclaimed as soon as possible following completion of various project phases.

Two viewpoints from I-84 have been determined to be most representative (Mileposts 272 and 266). **Figures 3-3 and 3-4** show the views of the mine from a driver's perspective in the morning when the mine is front-lighted. **Figures 3-5 and 3-6** show the same driver's view during the afternoon when the mine is in the mountain's shadow. The two sets of photos illustrate the difference that lighting can make in the visibility of the mine. The direct lighting provides more clarity and definition making the project more readily visible in the morning than in the afternoon when shadows obscure some of the features.

From these viewing locations, the project area appears as background. When the visual character of this area was classified by the Forest Service, the majority of the east facing slopes visible from the highway were designated Variety Class B (common) with the remainder Class C (minimal). The viewer sensitivity level is predominantly rated as 1 (Highest Sensitivity) and of primary importance because I-84 is part of the Federal Interstate Highway System. In determining the viewer sensitivity, it has been assumed that at least

Figure 3-3 Morning View of Mine Site from I-84 Milepost 266

Figure 3-4 Morning View of Mine Site from I-84 Milepost 272

Figure 3-5 Afternoon View of Mine Site from I-84 Milepost 266

Figure 3-6 Afternoon View of Mine Site from I-84 Milepost 272

one-fourth of the users of the highway have major concern for scenic qualities. These parameters are combined to determine the visual quality objectives (VQO) for an area.

The primary VQOs for the project area are partial retention for the upper east-facing slopes and modification on the lower slopes (**Figure 3-7**). Each of the VQOs has corresponding standards and guidelines.

A VQO of partial retention (PR) allows results of management activities to be visible but not recognized as an unnatural occurrence. Changes are not to be visually evident to the average person, and they should not attract attention with the natural appearance of the landscape remaining dominant. This partial retention objective must be met as soon as possible after project completion (within one year).

A VQO of modification (M) allows the results of management activities to be seen and possibly dominate the landscape but should repeat natural patterns, if possible, as soon as possible within a maximum of five years of project completion.

The VQO of maximum modification (MM) allows the results of management activities in foreground or middle ground to extensive or dominating but should appear as a natural occurrence as background. Reduction in contrast should be accomplished within five years if practical or within ten years as a maximum. The VQO of maximum modification is the lowest acceptable VQO.

Many of the components of the existing mine and the proposed expansion occur on lands that have been designated with the VQO of partial retention (**Figure 3-7**). It has been recognized that two of the standards of the partial retention VQO would likely not be met by mining activities. One is meeting the reclamation standard within one year following completion of activities. In arid and semi-arid climates such as those in the western U.S., it takes more time for vegetation growth and establishment. The other standard that would not be met would be the need for activities not to be visually evident. Components of a mining project that would not be recontoured and revegetated (most notably mine pits and some waste rock dumps) would be noticeable for the long-term.

The general direction of the Forest Plan is that all activities on National Forest System land shall attempt to meet the VQO designated through the Forest planning process. However, the Plan recognizes that the designated VQO cannot be met in some cases for biological, technical, or legal reasons. In these cases, an attempt shall be made to meet the next lower VQO. The Plan also indicates that the boundaries and designations of assigned VQOs may be refined based upon better information acquired during the project level analysis.

3.1.6 Cultural Resources

The prehistory of southeastern Idaho begins with the habitation of Wilson Butte Cave, near Jerome, at about 15,000 years ago, during the late Pleistocene (Gruhn, 1961). Fauna of this period were hunted by early Native Americans of the Paleo Indian Tradition using large lanceolate projectile points of the Clovis, Folsom, and Plano traditions.

During the Pleistocene, the Salt Lake Basin was filled by Lake Bonneville. Lake levels reached their maximum heights at the 5133 foot elevation about 15,000 years ago (Smith and Street-Perrott, 1983:194, 195). The project area includes this high terrace of Pleistocene Lake Bonneville.

With the end of the Pleistocene about 11,000 years ago, environments, fauna, and cultural adaptations changed. The cultural readjustment to Post-Pleistocene conditions is clearly evident by about 7,000 years ago when Archaic cultures evolved. The Archaic period lasted until the advent of Euro-americans and is characterized by continued reliance on hunting and gathering, by stylistic changes in projectile point types, by the fine tuning of settlement and subsistence strategies to accommodate environmental change, and by the eventual appearance of ceramics.

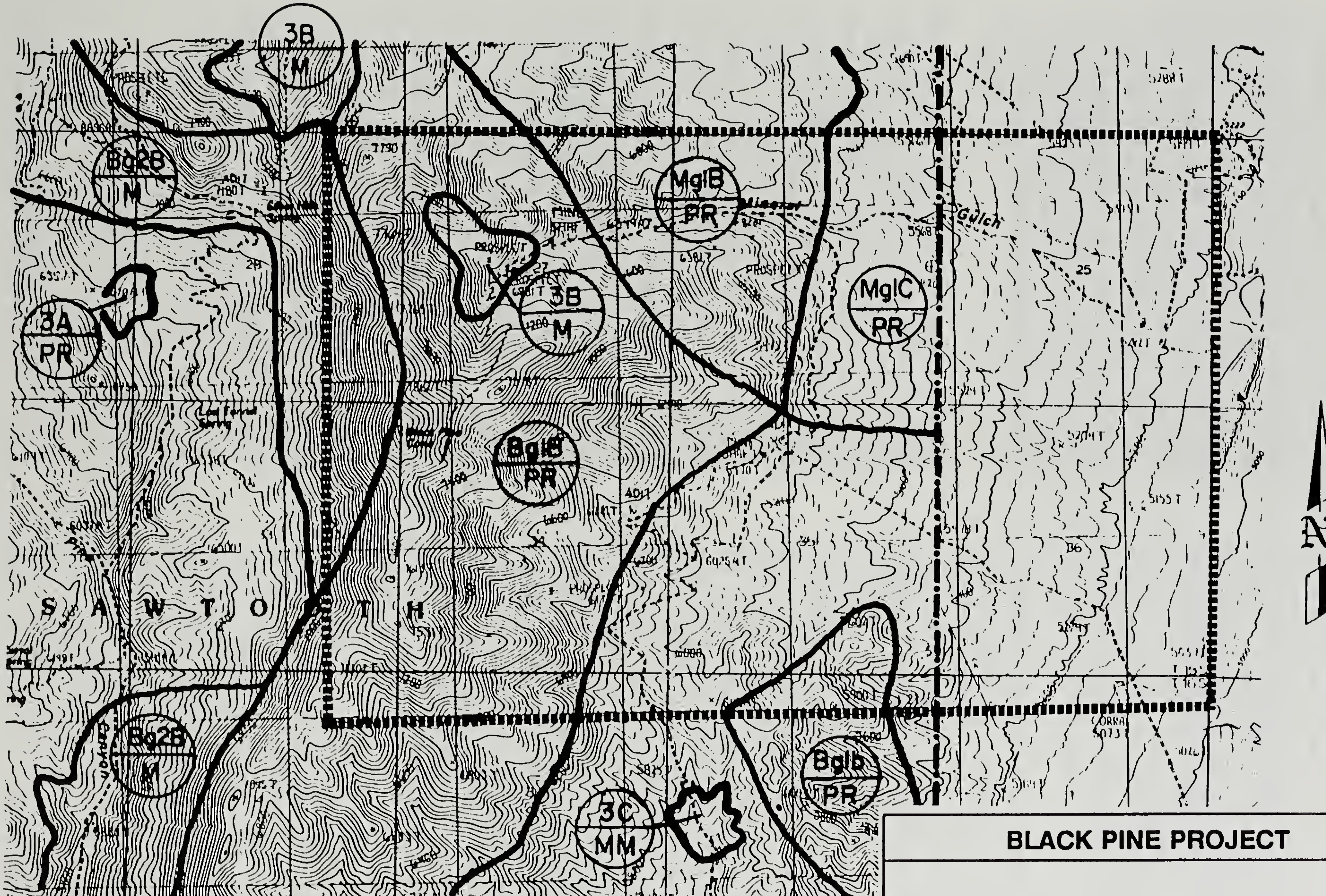
The prehistoric archeology of the region is represented by a number of sites in the project area. A number of historic and prehistoric sites within 5 to 10 miles of the mine expansion area have been identified by previous cultural surveys. The sites include open campsites or workstations, isolated finds, and one rockshelter. In general, the prehistoric sites are located either near springs or on former terraces of Pleistocene Lake Bonneville, and suggest activities related to hunting and/or short term habitation.

Euro-american entry into the vicinity began with the trapping expeditions of John Jacob Astor's American Fur Company, including Milton Sublett, who were working the Raft River Valley, just west of the Black Pine Range (Steelsmith 1963:2). After the decline of the fur trade, the overland routes were used and expanded by emigrants from the East and South.

Emigrants passed near the project area on Hudspeth's Cutoff from the Oregon Trail. This cutoff was established in 1849 by miners headed for the California gold fields. The cutoff left the Oregon Trail at Soda Springs and passed near Sublett to the Raft River/Malta area (BLM 1976:1-16).

By the 1860's, the grasslands of the Juniper and Curlew Valleys were being used as remote pastures by Utah ranchers. By 1890, the sheep industry gained influence on the area, and numerous conflicts took placed between sheepmen and ranchers.

Mormon farmers moving north from Utah settled in the Elba area in 1873 bringing with them the principles of irrigation. By 1876, 20 Mormon families had settled in Sublett (Idaho Yesterdays 1979:37).



From the Sawtooth National Forest
Land and Resource Management Plan

$\frac{\text{Bg1B}}{\text{Pr}}$ = $\frac{\text{View Dist. * Senisitvity Level * Variety Class}}{\text{Visual Quality Objective}}$

Study Area Boundary

BLACK PINE PROJECT	
Visual Quality Objective Map	
	FIGURE 3-7

The first mining claims were recorded in the Black Pine area beginning in 1880 when the railroad to Kelton, Utah brought prospectors to the area. At that time, the Black Pine Mining District was formed to work silver and lead claims. By 1888, 25 to 30 miners were at work on the Black Pine claims. The mines had limited production during 1890's and again around 1914 (Idaho Historical Society Reference Series).

By the 1920's the mines in the District included the Silver Hills Mine on the northwest edge of the area and the Ruth and Hazel Pine Mines, both inside the current BPMI mining area. Work continued in the Black Pine District into the 1930's (Anderson 1931:137-138). Six mining sites have been recorded on and near the current mining area. In 1949, Duvall and Company controlled the property, named it the Virmyra Mine, and began open pit mining in the same area as the current Tallman Pit. Ore was milled and leached in tanks using sodium cyanide. Gold was recovered in a precipitation plant utilizing zinc dust. When the ore contained cinnabar, a mercury sulfide (HgS), the mercury was recovered in the gold precipitate. The ore was milled and leached on-site with the leached material discharged behind a tailings dam within a small intermittent drainage. This material is referred to as the historic Tallman tailings and it occurs within the existing BPM mine area. Historic mining ceased sometime around 1954.

Dry land farming began in the Curlew Valley around 1900. A second wave of homesteaders filed claims on dry land east of the mine area during the years from 1915 to 1917. Nine historic homestead sites and five historic dumps reflecting this occupation have been recorded on and near the mining area.

The existing mine site and portions of the proposed expansion area has been surveyed for cultural resources. Earlier surveys were conducted for previous exploration. During late 1987 and spring 1988, a survey was done to determine the extent of cultural resources in the mine area. In 1989, the Silver Hills area and Anomaly G were surveyed along with the East Dry Canyon road. In 1992, an additional Class III survey was conducted on over 640 acres in the mine area and a reconnaissance survey at the entire proposed mine expansion area. All of the inventory indicated very low density and occasional prehistoric use of the area. All of the identified artifacts consisted of manufacturing debris or cutting tools which were probably used in hunting activities. Since no temporally diagnostic artifacts were located, the age and duration of prehistoric use of the project site could not be determined.

The historic sites reported during the inventories indicated that the primary use of the area during the 19th and 20th centuries involved mining and homestead activities with much of this taking place in the 1920s. The historic resources were

likely disturbed or degraded by later mining and ranching in the area.

The 1989 survey concluded that because of the insignificance of the resources located, cultural resource clearance was recommended for the Silver Hills and Black Pine Cone study areas. Further work relating to cultural resources at these two project areas was not recommended provided the projects were carried out as planned at the time of field work.

3.2 Biological Environment

3.2.1 Vegetation

The area of study lies in a very sparsely populated portion of the sagebrush-grass region of Southern Idaho in a very northeastern portion of the Basin and Range Province. The area supports a semi-desert type of vegetation know as shrub-steppe. The Snake River Plain, part of the Columbia Plateau, lies only seven miles north and six miles west of the site. Because low water divides and wide valleys do not constitute a physical barrier to plant migration, the Snake River Plain is not well separated from the Great Basin in terms of plant geography, and therefore, the Plain and the Basin have essentially the same vegetation.

The location of the various vegetation communities found in any one area are influenced by soils, aspect, temperature, moisture, and elevation. Because both elevation and aspect change across the study area, which results in a range of soils, temperature, and moisture, the vegetation found there is correspondingly diverse. It is possible to describe the site vegetation in terms of four major plant communities:

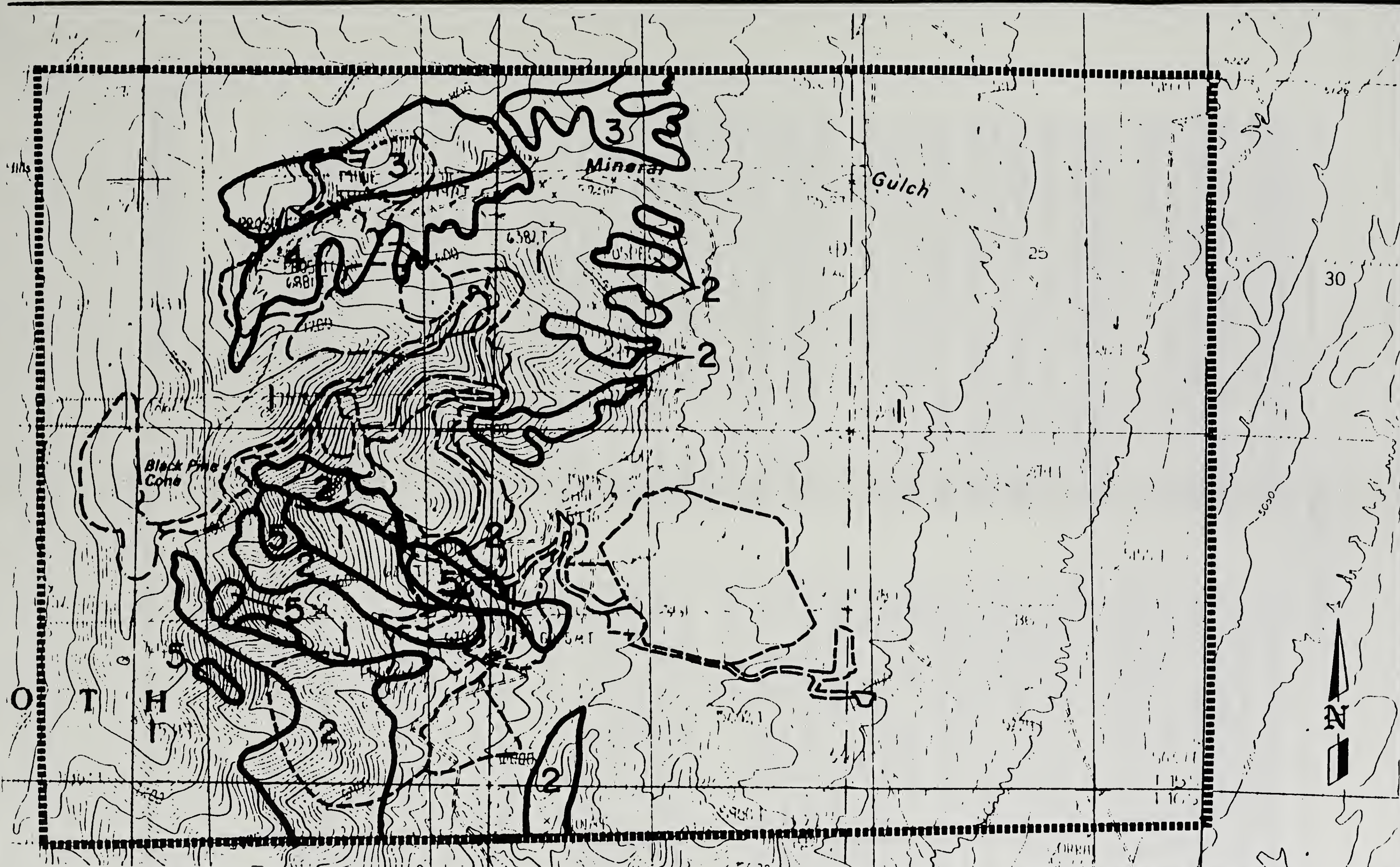
Conifer/Mountain-mahogany
Sagebrush-Grass
Utah Juniper
Subalpine

Figure 3-8 shows the relative locations of the different communities.

Sagebrush-Grass Community Types

The majority of the proposed expansion project would occur within the sagebrush-grass community. The sagebrush-grass is the most extensive plant community on the study area, occurring in all habitats not otherwise supporting juniper, mountain mahogany/conifer or subalpine types. These habitats range form the warm, dry, gently sloping lower elevations extending to the valley floors, up the increasingly steeper slopes of the foothills to all but the steepest north-facing slopes and highest mountain ridges (E Pit). Most of the disturbance resulting form the proposed project would occur within this community.

As is true of any plant community found in such diverse environments, the sagebrush-grass community can be further broken down into several discrete plant associations, of habitat types based ont he particular species of sagebrush and grass dominating the site.



LEGEND
1 Sagebrush-Grass
2 Juniper
3 Mountain-Shrub
4 Conifer-Mountain Shrub
5 Barren
—·—·— Sawtooth National Forest Boundary
▮▮▮▮▮▮ Study Area Boundary

BLACK PINE PROJECT	
Vegetation Types	
SCALE: 1"=2000'	FIGURE 3-8

The sagebrush-grass habitat type is subdivided into two separate series: those with big sagebrush species as the dominant overstory shrub, and those with dwarf sagebrush species as the dominant overstory shrub.

The big sage/bluebunch wheatgrass habitat type occurs at the lowest elevations on BLM lands on the proposed mine expansion project area. The soils are generally deep and fertile. Wyoming big sagebrush, basin big sagebrush, rubber rabbitbrush and green rabbitbrush are present, along with bitterbrush. Following disturbance, cheatgrass can invade the understory and co-dominate with bluebunch wheatgrass.

Wyoming big sagebrush (*Artemesia tridentata wyomingensis*) is relatively palatable to wildlife and is seasonally browsed by big game and sage grouse, which makes the habitat types important as winter range. The habitat type is also important spring-fall range for domestic grazing animals. Livestock use of this sagebrush subspecies is light to moderate, depending on the amount of understory herbage available. It also provides important cover and thermal protection for small birds and mammals.

Basin big sagebrush (*Artemisia tridentata*) has been found to be low on the palatability scale for both wildlife and domestic livestock. However, it provides excellent cover and thermal protection, especially for upland birds and small mammals, making it valuable as wildlife habitat.

Because soils supporting this habitat type are deep and potentially fertile, reseeding and reclamation efforts can be quite successful. Crested wheatgrass has been reseeded on most of the BLM lands formerly supporting the big sage/bluebunch wheatgrass habitat type in the mine area.

The mountain big sagebrush/bluebunch wheatgrass habitat type generally occurs just above the Wyoming Basin big sagebrush/bluebunch wheatgrass type. Mountain big sagebrush (*Artemesia tridentata vaseyana*) dominates this plant community, which also supports relatively large amounts of bitterbrush and some rabbitbrush. Great Basin wildrye, junegrass, Indian ricegrass, buckwheat, lupine, and arrowleaf balsamroot also share the under story. Cheatgrass has invaded some of the more heavily grazed or otherwise disturbed areas.

This habitat type is important spring-fall range for livestock and winter range for deer and pronghorn. Mountain big sage is seasonally browsed by big game and is an important contribution to their diet in the winter months.

At the upper elevational range of the mountain big sage/bluebunch wheatgrass habitat type occurs a related, but conspicuously different habitat type, the mountain big sagebrush/mountain snowberry/bluebunch wheatgrass habitat type. This type contains several species of shrubs, in addition to mountain snowberry including serviceberry, chokecherry, and bitterbrush. It provides very important summer-fall

range for big game animals, and the palatability of the shrub species is good for both livestock and big game.

The two remaining sagebrush-grass habitat types both have dwarf sagebrush species as the dominant overstory shrub and occur on the study area's mountain slopes. These two habitat types are quite similar in understory species composition.

The black sagebrush/bluebunch wheatgrass habitat type occurs on the lower warm, dry southern and eastern mountain slopes on limestone-derived calcareous soils. Sandberg bluegrass, needle-and-thread grass, and Indian ricegrass also occur in the understory. There is also a diverse complement of forbs which may include Hood's phlox, paintbrush, and prickly pear cactus. This habitat provides important habitat for pronghorn and sage grouse, and although black sagebrush is low on the palatability scale for mule deer, it seems to be preferred along with mountain big sage by sage grouse as winter food.

The low sagebrush/bluebunch wheatgrass type is the other dwarf sagebrush habitat type on the study area. This habitat occurs on slopes that are more northerly and therefore cooler and moister than those on which black sagebrush grows, although the understory species composition of both habitat types is quite similar. Sharptails and sage grouse are often found on these mesic slopes, which provide vegetation for both food and cover.

Utah Juniper Community Type

Utah juniper forms scattered stands in the foothills and bench areas at the base of the Black Pine Mountains. It also extends out onto the valley floor in a large arc, growing on the paleo-shoreline of ancient Lake Bonneville, where it is likely associated with a sandy soil.

The Utah juniper supports a sparse understory plant community with a relatively low species diversity and productivity. The understory grasses include Sandberg bluegrass and bluebunch wheatgrass. This type's most important use is providing nesting habitat for hawks, including ferruginous, Swainson's, and red-tail, and for other birds. The Ferruginous hawk nests almost exclusively in junipers. The community provides shade and cover for both big game and livestock. Current BLM management plans for juniper include harvest for posts and Christmas trees and possible chaining to increase deer carrying capacity. Some of the areas near the mine site have been cleared in the past to increase livestock forage.

Conifer/Mountain-mahogany Community Type

This community type, representing the only potential timber resources on the study area, occurs solely in the Mineral Gulch drainage. According to a timber stand inventory conducted by the Forest Service, this community type can be divided into two separate habitat types: the Douglas-fir/cutleaf mountain mahogany

habitat type and the Douglas-fir/elk sedge habitat type.

The Douglas-fir/mountain mahogany type occurs exclusively on north-facing slopes above Mineral Gulch. Utah juniper shares the understory with mountain mahogany. The timber productivity potential is low to very low. Except for one small stand, all stands occupied by this habitat type are classified as non-commercial. Mountain mahogany is a valuable winter browse plant for deer. It provides valuable winter cover for both sharp-tailed and sage grouse, summer habitat for blue grouse, and spring nesting habitat for a number of species of small birds.

A second habitat type, the Douglas-fir/elk sedge, has been identified by the Forest Service on south and east-facing slopes above Mineral Gulch. This community type would provide some forage for domestic stock and would also be an important winter food source for big game and sharp-tailed grouse, and be good spring nesting habitat for passerines, especially if quaking aspen stands are present. Only one small stand in this type has been categorized by the Forest Service as commercial timber.

Subalpine Community Type

This type occurs only on the high elevation, windswept, treeless ridgetops (E Pit). Growing seasons are sort, the soil is shallow and high wind velocities, low temperatures, and the low availability of water are limiting factors to plant growth.

The subalpine community type is characterized by low-growing cushion and mat-forming plants, including phlox, stonecrop, short grasses, and cryptograms (lichens, mosses, and liverworts). Its value to wildlife species is limited.

Special Status Plant Species

There is no documentation of the existence of a population of threatened, endangered, rare, or sensitive plants on the proposed mine expansion area, or in Black Pine Canyon or Curlew Valley. Only one species has been discovered in the Black Pine Mountains (*Eriogonum desertorum*), and it is found only on War Eagle Peak, the highest elevation in the range, approximately 2.5 miles northwest of Black Pine Cone.

3.2.2 Grazing

All the lands on the proposed expansion area are currently being managed primarily as grazing allotments for livestock use by the Sawtooth National Forest as shown on **Figure 3-9**. Lands east of the expansion area are also managed for grazing by the Deep Creek Resource Area of the Burley District of the BLM. All proposed expansion activities would occur on Forest System lands (**Figure 3-9**).

Forest System land in the proposed expansion area (Sections 26, 27, 33, 34, and 35) is in the northern half of the Mineral Gulch Allotment. In Section 33, the proposed expansion area also includes a small area of the Black Pine Cattle Allotment.

However, this part of the Black Pine Cattle Allotment is little utilized by cattle because of the steepness of slope, topography, and distance to available drinking water. The Mineral Gulch Allotment was historically used as a sheep allotment until 1977 when it was changed to cattle use. At that time a temporary permit for 100 cattle was issued by the Forest Service.

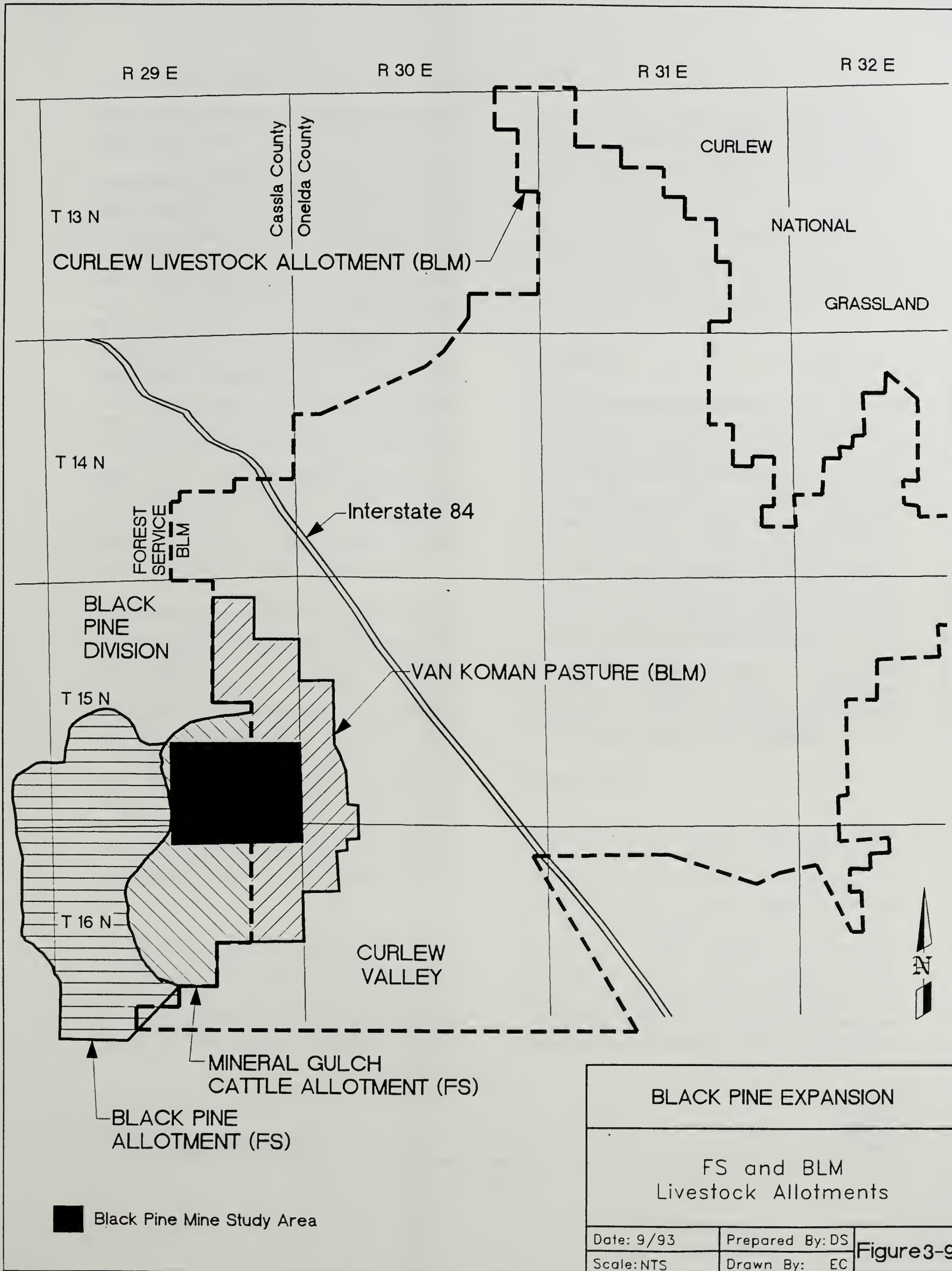
Since that time, the north half of the allotment has been used sparsely or not at all, due to lack of surface water. It was last used in the early 1980's, but since that time the permittee has elected to not use this part of the allotment rather than haul in water for his cattle. Because the lack of water limits full use of the allotment, several plans for future water development have been proposed. Plans include piping water from Formation Canyon (approximately one mile west), piping water from below the existing Tallman Mine, or pumping water from the permittee's property. None of these plans has yet been implemented.

The current permittee is Cypress Farms, Inc. of Salinas, California, with Jess Etchemendy as manager. The permit is for 100 cow/calf pairs to graze the allotment from June 16 to September 25, for 440 AUMs. However, because cattle can only graze the southern part of the allotment, the Forest Service has only allowed the permittee 100 cattle in the south part of the allotment from July 1 to August 31 for 264 AUMs.

The Forest Service conducted an on-the-ground vegetation inventory on 1971 and 1972, as part of the range analysis for the Mineral Gulch Allotment. The vegetation on the proposed project area was separated into 16 different units, which included sagebrush, browse-shrub, juniper, and grassland, as well as barren areas. The majority of the area's vegetation, about 80 percent, is classed as sagebrush. The primary understory species in this type is bluebunch wheatgrass. Ten percent of the area is browse-shrub and eight percent is juniper. Barren areas and grassland comprise the remainder.

At the time the inventory was conducted, most of the range (59 percent) was in fair condition, 35 percent was in good condition, and three percent was in poor condition. Trend was down in 85 percent of the range, stable in 13 percent, and up in one percent. Because grazing by domestic livestock has been greatly reduced since the allotment was converted from sheep to cattle, range condition has very likely improved since the 1971-1972 range analysis was conducted.

The average annual production on the Forest System land is approximately 475 dry pounds per acre, averaged out over the entire project area. The carrying capacity is 345 AUMs at a proper use factor of 50 percent for key species (28 percent for all species), assuming even use of the area and 990 pounds per AUM.


R 29 E
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Cassia County
Oneida County
CURLEW LIVESTOCK ALLOTMENT (BLM)
CURLEW
NATIONAL
GRASSLAND
Interstate 84
FOREST SERVICE
BLM
BLACK PINE DIVISION
VAN KOMAN PASTURE (BLM)
CURLEW VALLEY
MINERAL GULCH CATTLE ALLOTMENT (FS)
BLACK PINE ALLOTMENT (FS)
Black Pine Mine Study Area
N
BLACK PINE EXPANSION
FS and BLM Livestock Allotments
Date: 9/93
Scale: NTS
Prepared By: DS
Drawn By: EC
Figure 3-9

western and southern slopes of the Black Pine Mountains.

The IDFG aerial survey of December 12, 1990 over the Black Pine Range observed 21 bucks, 110 does, 82 fawns, and 114 unclassified deer for a total of 327 animals. The largest concentrations of deer were on the west slopes of the Black Pine Range or on the south-facing slopes of drainages on the east side of the range. There were 106 deer observed on the west side of the range and 221 on the east side. The largest groups of deer observed on the west side were in East Dry Creek and Black Pine Canyon (approximately 1/2 mile south of Black Pine Cone). Large groups observed on the east side were located in upper Mineral Gulch and the south fork of the Tallman drainage.

Primary summer range has not been designated in the mine area. However the upper regions of Mineral Gulch may receive limited usage. Traditional summer ranges are located northeast of the existing mine site and in the Sublett and Rockland mountains. The major portion of the mine area is located in mid- to late-stage juniper succession. This entire area burned during the 1940s and is changing from a grass/shrub community to a juniper community which is less productive for deer.

Some deer moving through the mine area during the spring may fawn in the aspen and mountain brush habitats. In particular, upper Mineral Gulch and the upper regions of the existing mine area contain the necessary cover characteristics for fawning. However, IDFG has not designated any critical fawning habitat in the mine area.

The mine site, both current and the expansion proposal area, are closed to hunting. It is also mining company policy that no firearms are allowed on site.

Pronghorn

A small pronghorn antelope population of about 20 to 60 animals uses the Juniper and Curlew Valleys in both Idaho and Utah (**Figure 3-10**) (Forest Service 1988). Although the animals move back and forth between Idaho and Utah, some pronghorn are found in the Idaho portion of the Curlew Valley throughout the year; therefore, the area has been identified as yearlong pronghorn habitat. They are hunted in Utah, and their numbers in Idaho usually increase during the hunt. It is thought that the pronghorn have a significant kidding area somewhere in Juniper Valley, but no areas have been identified.

Sage Grouse

Sage grouse are the most important game bird in the area and are found throughout the Juniper and Curlew Valleys and adjoining mountain slopes. Sage grouse use the sagebrush-grass vegetation types for almost all of their habitat requirements (Wallestad 1971). Sage grouse winter habitat consists of flat areas where the sagebrush sticks out of the snow, as well as high wind-swept ridges. Wind swept ridges

3.2.3 Wildlife

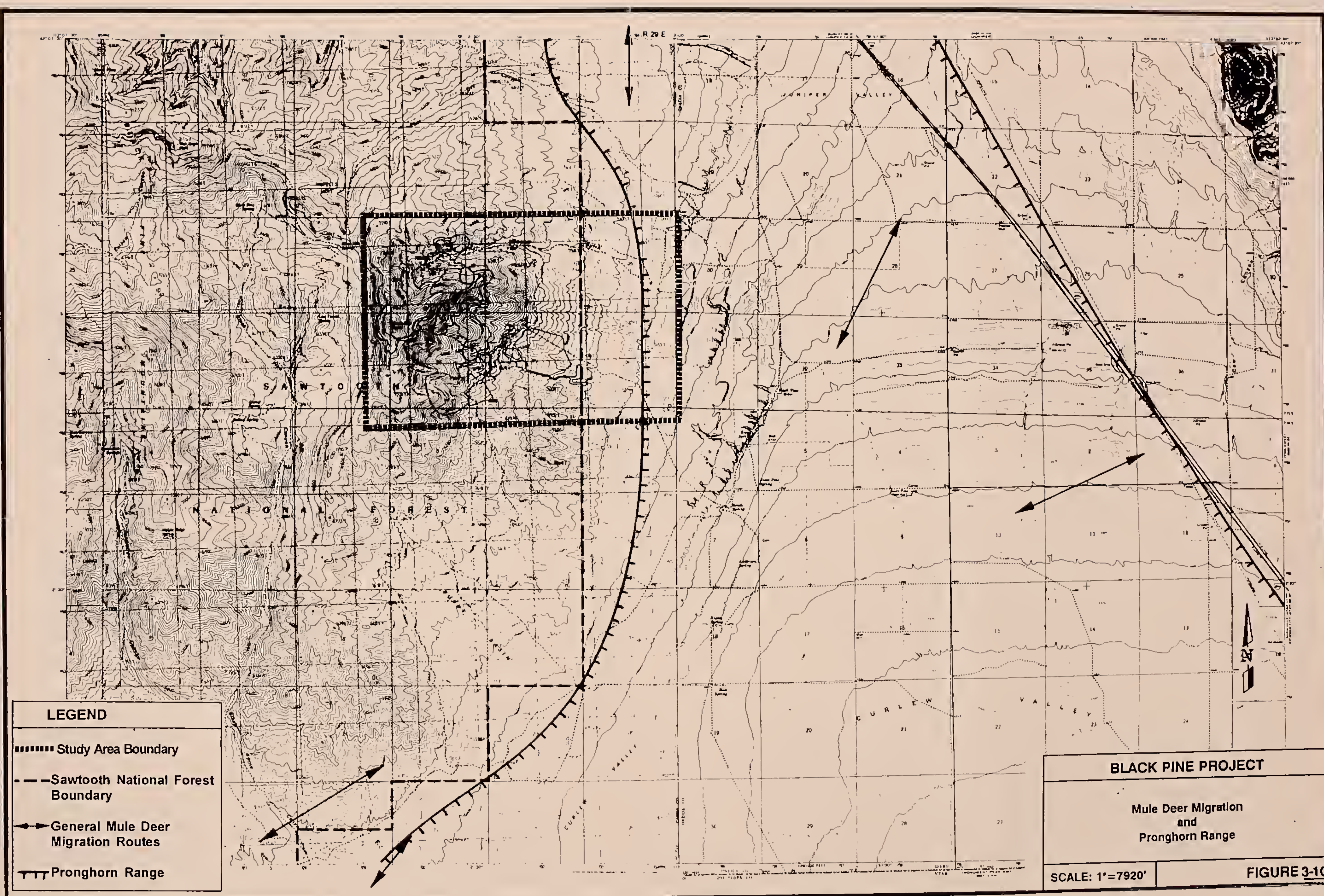
The wildlife resource in the existing Black Pine Mine area strongly reflects the predominance of the sagebrush and pinyon-juniper life zones although no pinyon occurs on the mine site itself. Habitats vary from large expanses of sagebrush to small areas of pinyon-juniper woodlands. Because no perennial streams exist in the mine area, aquatic habitat is limited to springs and a wildlife pond which exists in the eastern portion of the area (Hansen Allen and Luce 1992). Consequently, the wildlife resource of the existing mine area is upland in character.

Regionally, several groups of wildlife species are of primary interest and concern to the public and resource management agencies. They are game animals, raptors, and special-concern species. Specific species include the mule deer, pronghorn antelope, sage grouse, Columbian sharp-tailed grouse, mountain lion, bobcat, kit fox, blue grouse, ferruginous hawk, Swainson's hawk, golden eagle, burrowing owl, pygmy rabbit, night snake, loggerhead shrike, and spotted bat and western big eared bat. No threatened or endangered species occur in the area (USFWS 1992), but the ferruginous hawk and Swainson's hawk are both Candidate 2 species which may occur in the area. Candidate 2 species are those that could be listed in the future if populations continue to decline. Biological evaluations for these two Candidate species are presented in **Appendix B**.

Mule Deer

Mule deer, the most important economic big game species in the Black Pine Mine area, use the mine mainly as a migration corridor. Current information from IDFG Species Management Plan for mule deer for Unit 57 (of which the Black Pine Range is a small portion) indicates a resident deer population of approximately 2,000 head. Historically, 2,000 to 4,000 mule deer migrated through the area between summer ranges in the Sublett and Rockland ranges and winter ranges in the Black Pine mountains (**Figure 3-10**). However, since its construction in 1974, Interstate 84, has disrupted this traditional route. IDFG estimates a reduction in migrating deer of 50 to 75 percent. Since 1968, surveys of Burnt Basin to East Rye Canyon (south end of Black Pine Range) document a decline in deer use of the area from 262 deer in 1968, to no deer observed in 1989. Although IDFG has designated the existing mine site as important transitional habitat for migrating mule deer, it appears that Interstate 84 has effectively reduced the number of animals using the area.

In addition to migrating through the Black Pine Mine, some deer may spend mild winters in the mine area. During this time deer tend to stay on high sagebrush ridges which are blown clear of snow. These ridges provide both forage (bitter brush) and easy lanes of travel. However, during more severe winters, the deer move to their traditional wintering ranges on the



BLACK PINE PROJECT

Mule Deer Migration
and
Pronghorn Range

SCALE: 1"=7920'

FIGURE 3-10

are known to be utilized by sage grouse in the existing mine area (Smith 1992). Leks for both sage and Columbian sharp-tailed grouse have been mapped by the BLM (**Figure 3-11**). However, at this time no known sites are located near the mine expansion area (Kumm 1992). No population estimates are known for the existing mine area. However, 1988 surveys recorded an unspecified number of sage grouse in the mine permit area.

An aerial survey by IDFG in December 1990 observed 129 sage grouse (Smith 1991). One group of 26 birds was located on the west slopes of Black Pine Cone approximately 1/2 mile west of the peak. A group of over 100 birds was located on the east side of the Black Pine Range in the SE¼, SE¼ of Section 14, T15S, R W.

Columbian Sharp-tailed Grouse

The Columbian sharp-tailed grouse is listed as a Species of Special-Concern by the IDFG and as a Sensitive Species by the Forest Service and BLM. Although limited hunting now occurs for the Columbian sharp-tailed grouse in the Curlew Grasslands, approximately 20 miles east of the analysis area, the cause for its decline is the result of habitat loss and not overharvesting (Hudek 1992). Sharp-tailed status in Curlew Valley is unknown. No specific sharp-tailed grouse habitat has been identified in the Curlew Valley. Specific habitat has been identified on the northeast quadrant of Black Pine Mountain and there have been sightings in the Mineral Gulch area. Hunting of this species occurs in Game Management Unit 57.

Columbian sharp-tailed grouse prefer relatively undisturbed native grass-shrublands (Marks and Marks 1987). During the summer, they select the mountain brush community types. Mountain brush also provides food in the winter and escape cover year-round (Marshall and Jensen 1937). In addition to the Mountain brush habitat, grouse near the mine area use habitats located between dryland wheat and native vegetation (Smith 1992).

Blue Grouse

Although a limited survey by the IDFG in 1988 found a few blue grouse in Mineral Gulch, these grouse occur primarily at the higher forested elevations of Black Pine Mountain.

This grouse winters in the upper forested portion of the mountain and raises its broods in the bordering sagebrush habitat of the lower elevations. Forested areas are considered important winter and summer habitat providing cover and shade. During brood rearing, sagebrush with high forb content is important for cover and insect production to provide food supply for the young.

Kit Fox

The kit fox historically inhabited the Curlew Valley. However, none have been observed in the last twenty to thirty years (Kumm 1992). This species is recognized

by the BLM as a Sensitive Species in Idaho. None have been recorded in the mine area and preferred habitat is thought to be in the lower portion of the Curlew Valley.

Kit fox feed on small mammals, small birds, reptiles, amphibians, and insects. Some information suggests that they are often found in areas with kangaroo rat populations. Generally they are found below 5500 feet elevation in shrubby to shrub-grass vegetation types (BLM no date). They prefer open, level, sandy sites for their den locations, which they use throughout the year.

Bobcat/Mountain Lion

The bobcat is found in low numbers throughout the general Black Pine Mine area. They are recognized as a furbearer by the IDFG, which has established a regular hunting/trapping season on the animal. No critical or important use areas have been identified in the existing mine area.

The bobcat is primarily associated with the Utah juniper vegetation type, often near rock cliffs and ledges. They feed primarily on small rodents, and birds, and may occasionally take deer and antelope fawns and domestic sheep. Bobcat numbers in the area are probably low for two reasons. First, large predators require a large home range; therefore, densities are rarely high. Second, the amount of ongoing human disturbance from the mine reduces the attractiveness of the mine area for bobcats.

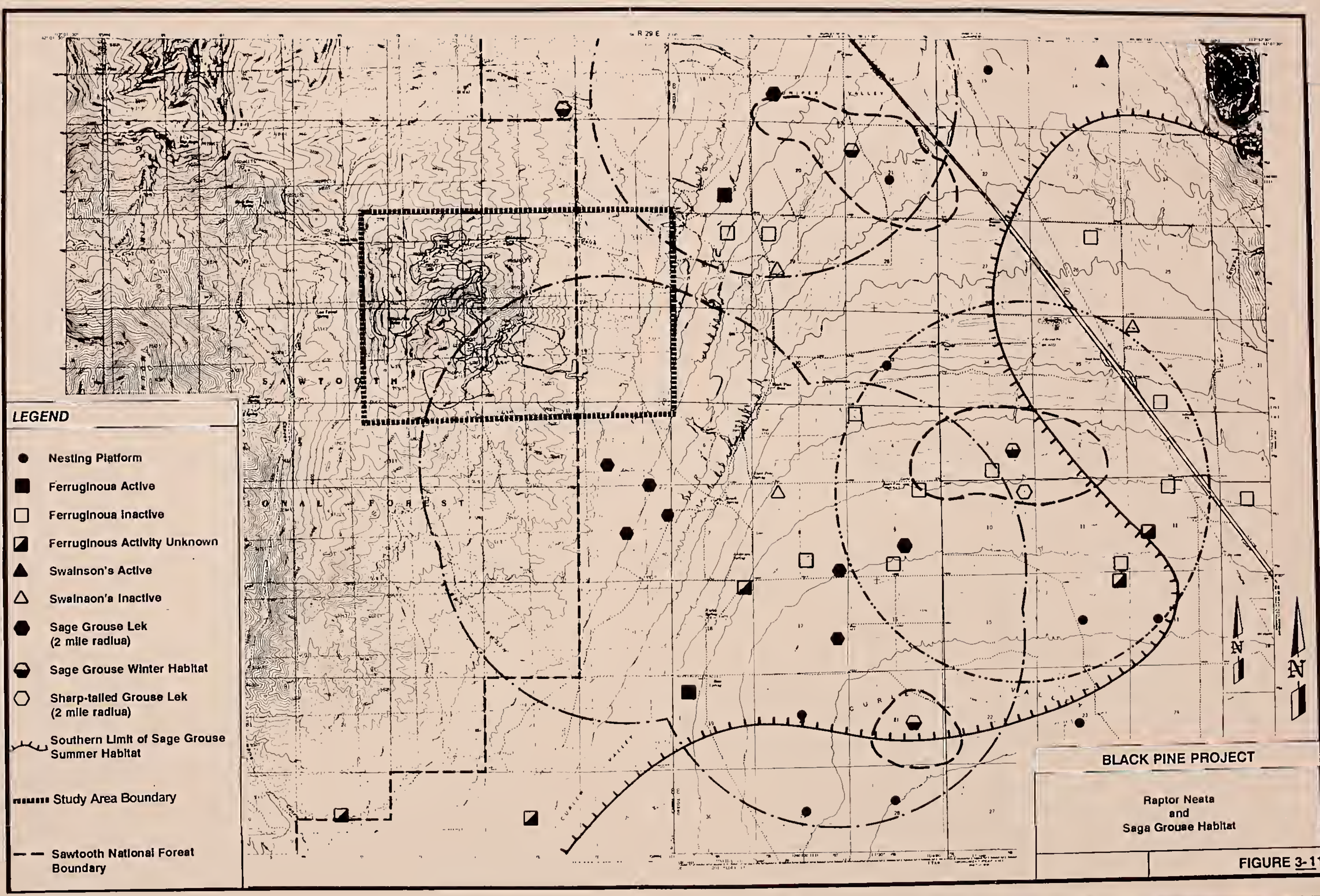
The mountain lion is classified and managed by IDFG as a big game animal. The mountain lion is hunted and trapped on a limited basis in the general Black Pine Mine area.

Mountain lions are generally associated with cliffs and rocky outcroppings. They feed mostly on mule deer; however, they also will prey on small mammals (Chapman and Feldhamer 1982). Mountain lion movements generally follow those of mule deer. Therefore, lions would occur in the existing mine area during the fall and spring migrations and when mule deer winter on the site. Like the bobcat, mountain lions also require a large home range and would likely avoid the area due to ongoing human disturbances. Therefore, mountain lion numbers would not be expected to be high in the existing mine area.

Ferruginous Hawks

Ferruginous hawks are the raptor of greatest concern in the analysis area. The ferruginous hawk is listed as a category two candidate species by the USFWS. It is also listed as a Sensitive Species by the BLM. The agencies also identify all of the Juniper Valley as important hunting territory for the ferruginous hawk.

Although their numbers have declined in the area in the past 12 years, the Burley District of the BLM has one of the densest



BLACK PINE PROJECT

Raptor Nests
and
Sage Grouse Habitat

FIGURE 3-11

concentrations of ferruginous hawk nests in Idaho, many of which were located in the Juniper and Curlew Valleys (Bechard et al 1986). In 1987 there were at least two known active ferruginous hawk nests in Juniper Valley, with the possibility of an additional three used in the 1986 nesting season (**Figure 3-8**). In addition, there are fourteen previously active nests in Juniper Valley, as well as nine man-made nesting platforms. The area within one mile of each ferruginous hawk nest has been designated as crucial habitat. Currently the BLM is monitoring nest sites and reports no active nests occurring within the proposed expansion area (Kumm 1992).

Ferruginous hawks in southeastern and southcentral Idaho commonly nest in juniper woodlands, and are seldom found in areas having no more than minimal amounts of agricultural activity (Bechard et al 1986). In this part of Idaho, black-tailed jackrabbits are the most important prey with Townsend ground squirrels providing 10 to 20 percent of the diet. The decrease in active nests in 1985 was greater than in the previous ten years. This decline coincided with a region-wide decline in black-tailed jackrabbits and vole populations.

The ferruginous hawk is very sensitive to human disturbance, especially during the spring nesting season, and any increase in the level of human activity near an active nest may result in nest abandonment. The probability of nest abandonment is very high just prior to hatching of the young. The birds usually begin egg laying around the last of March to the first of April. The earliest hatching date is the very end of April to the first of May and can continue until the first week in June. Therefore, the critical time when the birds are most likely to abandon the nest would be from about March 15 through May 15. Once the young have hatched, the parental bond to care for the young is much stronger.

Swainson's Hawk

The Swainson's hawk is listed as a Category 2 Candidate species by the USFWS. Twenty-two Swainson's hawk nests have been located in the Burley District of the BLM. The population of this species in the general Black Pine Mine area is much smaller than that of the ferruginous hawk. Two inactive nests have been located in Juniper Valley. The only active nest is north of Interstate 84. The BLM has been monitoring ferruginous hawk nest sites, however no active nests are located within four miles of the proposed mine expansion area (**Figure 3-8**).

Swainson's hawks are associated with open grasslands, sagebrush, and agricultural lands. Nesting varies from isolated trees to bushes, and cliffs (Johnsgard 1986). However, most nests are located within one mile of riparian zones. Swainson's generally prey on ground squirrels, pocket gophers, and insects. This species is less sensitive to human disturbance than other raptors, and it often nests adjacent to

irrigated hay fields where spring activity by humans is common.

Northern Goshawk

The goshawk is listed by the BLM and the Forest Service as a sensitive species. Goshawks occur in a variety of habitats, depending upon the time of year. During the breeding season, they are primarily associated with dense northern forests. During the non-breeding season, use of habitats is more varied and may include coniferous forests, riparian areas, and sagebrush shrublands (Johnsgard 1986).

Nest sites are generally in mature coniferous, mixed hardwood, and deciduous forests with a closed canopy. Typically, nest trees are in the oldest stands of an area. The diameter at breast height (dbh) of nest trees varies from 8 to 20 inches. Of secondary importance for nest tree location is slope, most nests are on moderate to flat slopes (0 to 30 percent).

Foraging habitat for nesting goshawks usually consists of woodlands with large, mature trees. However, goshawks are characteristically opportunistic foragers and may use deep forests as well as forest edges. Goshawks forage in the ground-shrub, shrub-canopy, and canopy zones of the forest. Although common prey species include both birds and small mammals, birds make up the largest portion of the diet (Fowler 1988).

Although goshawks have not been observed in the general Black Pine area, they may occur in the area. However, the probability of their occurrence in the primary impacts area is low. This conclusion is based of three considerations. First, the reconnaissance did not identify potential nesting trees in the area exhibiting the preferred dbh and canopy closure. Second, slopes in the area exceed the preferred 0 to 30 percent slopes. Finally, the mining and exploration activities occurring in the area decrease the area's attractiveness to goshawks.

Golden Eagles

The golden eagle population appears to be stable in this part of its range. Eagles can be observed throughout the general Black Pine Mine area and currently have no special management designation. The closest active eyrie is east of Interstate 84. Crucial areas for the golden eagle are identified as being within one-half mile of any known eagle eyrie.

Burrowing Owls

Burrowing owls are listed as a Sensitive Species by the BLM. Burrowing owl surveys have been conducted near the analysis area in which fifteen nest sites were located during the 1979 and 1980 field season. However, all of these sites are located south of the existing Black Pine Mine.

Burrowing owl habitat is characterized by low sparse vegetation, with an availability of abandoned burrows. Burrowing owls will inhabit abandoned badger and mar-

mot burrows, and natural rock crevices. Lands under cultivation are not suitable for burrowing owl nesting (IDFG 1986).

Populations are not expected to be high in the existing mine area. This is based on two considerations. First, tall sagebrush is not preferred nesting habitat for the owls. Second, the large amount of agriculture in the area decreases the amount of available habitat.

Pygmy Rabbits

Pygmy rabbits are listed as a sensitive species by BLM. Surveys indicate the pygmy rabbit occurs in the general Black Pine Area (BLM 1991).

The pygmy rabbit is associated with sagebrush habitats. They prefer sagebrush which grows in high, dense clumps near springs, and in draws (BLM no date). The breeding season generally runs from March through May (Chapman and Feldhamer 1986).

Prey base monitoring on the Deep Creek Resource Area by BLM biologists in June 1990 and March 1991 observed five pygmy rabbits and one pygmy rabbit, respectively. A similar survey in May 1990 did not observe any pygmy rabbits. These numbers indicate a small population.

Night Snake

The night snake has been listed as a Sensitive Species by the BLM. However, the mine permit area occurs on the eastern border of its range. No critical habitat has been designated in the area. The night snake inhabits rocky outcrops in arid regions. The primary prey for this nocturnal snake is lizards (IDFG 1989). This species may occur in the expansion area.

Loggerhead Shrikes

Loggerhead shrikes are associated with open habitats, which have scattered perch sites. Sagebrush and pinyon juniper provide preferred nesting and foraging habitat. However, they may also be found in desert scrub, woodland edges and farmland (Johnsgard 1986). Because suitable habitat is present in the general mine area, loggerhead shrikes may occur in the proposed expansion area.

Spotted Bats/Western Big-Eared Bats

Spotted bats, a Forest Service Sensitive Species, occur in a variety of habitats. These include open ponderosa pine, desert scrub, pinyon-juniper, and open pasture and hay fields (Spahr et al. 1991). They also need rock crevices for roosting. Small cracks and crevices (0.8 to 2.2 inches) in limestone or sandstone cliffs are critical roosting sites (Spahr et al. 1991).

Two factors appear to influence the presence of spotted bats in an area (Spahr et al. 1991). First, evidence suggests suitable roosting sites may be a limiting factor. Thus, if the roosting sites are too limited, the bat is unlikely to inhabit the area. Second, spotted bats may be sensitive to human disturbance. The bats are typically

found in relatively remote, undisturbed areas.

The probability of spotted bats occurring within or near the Black Pine Mine's permit area is low. This conclusion is based on two primary considerations. First, no observations of the bat have been recorded for the area (Hilty 1992). Second, habitat within and near the permit area is probably suboptimal. Disturbance associated with the mine's ongoing activities reduces the area's attractiveness to the spotted bat.

Western big-eared bats, another Forest Service Sensitive Species, occur in a variety of habitats (Spahr et al. 1991). They inhabit juniper/pine forests, shrub/steppe grasslands, deciduous forests, and mixed coniferous forests between sea level and 10,000 feet. Additionally, caves, mine shafts, rocky outcrops, and, sometimes, old buildings serve as roost sites.

Like the spotted bat, availability of acceptable roost sites appears to be the primary factor influencing the occurrence of this bat. Western big-eared bats are very sensitive to human disturbance. They are known to abandon roost sites when disturbed (Spahr et al. 1991). Thus, the number of acceptable roost sites in and around human activity typically is very limited.

The probability of western big-eared bats occurring within or near the Black Pine Mine's permit area is low. This conclusion is based on two primary considerations. First, no observations of the bat have been recorded for the area (Hilty 1992). Second, habitat within and near the permit area is probably suboptimal. Disturbance associated with the mine's ongoing activities has reduced the area's attractiveness to the bat.

3.2.4 Habitat Evaluation Procedure

The Forest Service and Idaho Fish and Game suggested a Habitat Evaluation Procedure (HEP) be conducted to evaluate the potential habitat lost relative to the mine expansion.

The HEP was developed by the U.S. Fish and Wildlife Service as a standardized means for evaluating alterations to wildlife habitat. HEP is based upon the assumption that habitat quality and quantity can be numerically described. Models based upon habitat preferences have been produced for individual wildlife or fish species. These models are developed from combining numerical relationships that evaluate the ability of key habitat components to supply the life requisites for the selected species. The model output is scaled to produce an index between 0.0 (unsuitable habitat) and 1.0 (optimum habitat). This Habitat Suitability Index (HSI) was calculated on a per hectare area basis, and summed to produce Habitat Units (HUs) within a project area.

The HEP analysis consisted of three parts: 1) vegetation mapping, 2) estimation of parameters, and 3) calculation of HSI val-

ues. The vegetation mapping provided relatively homogeneous units of habitat for HSI evaluation. Areas of similar vegetation type were assumed to have the same vegetation attributes (e.g., shrub cover, herbaceous plant cover, plant height), and HSI values were calculated for individual vegetation units.

Habitat quality of five species of wildlife was assessed in a study area, containing approximately 1,228 hectares (3,035 acres), using the HEP. The five selected species were chosen to cover all of the dominant vegetation types in the area. The five species all use large areas of available habitat in the area and the three game species were also selected for their economic importance. Habitat quality for each of these wildlife species was assessed for the entire area prior to any large-scale mining disturbance. The effects of habitat alteration due to existing mining operations, leachpad facility and proposed new mining operations were then evaluated, based upon the pre-mining evaluation. The five species selected were blue grouse, sage grouse, mule deer, Brewer's sparrow, and rufous-sided/green-tailed towhee.

- **Blue Grouse**

The blue grouse was chosen to include habitat use of Douglas fir stands. The published HSI model of Schroeder (1984) was used as developed. The model evaluates the breeding season habitat needs of blue grouse. Parameters included in the model are: percent shrub crown cover (V_2), average height of shrub canopy (V_3), percent herbaceous canopy cover (V_4), average summer height of herbaceous canopy (V_5), number of herbaceous species in canopy (V_6), and distance to forest cover type (V_7). Parameter V_1 was not used in this model application as it does not apply to individual habitat types.

- **Sage Grouse**

The project area contains habitat for wintering sage grouse. These are areas where sagebrush remains exposed above the snow cover. Windswept ridges and sagebrush habitat at lower elevations represent the important areas on the project site. The unpublished model of MacCollough (U.S. Fish and Wildlife Service), used in the development of the Minidoka Dam Wildlife Protection, Mitigation, and Enhancement Plan (Idaho Department of Game and Fish 1991), was modified for use in this HEP analysis. The model evaluates winter habitat quality. Parameters contained in this model are: sagebrush canopy cover (V_1) and height of sagebrush above snow (V_2).

- **Mule Deer**

A draft model for mule deer was used to evaluate winter habitat for this species. Parameter values included in the model are: percent shrub crown cover (V_1), percent shrub crown cover of preferred shrubs (V_2), and percent summer herbaceous canopy cover (V_3). A factor of snow was also added where areas with prolonged snow depths over two feet were considered to have no forage value.

- **Brewer's Sparrow**

The Brewer's sparrow was selected to represent vertebrate species using sagebrush dominated vegetation on relatively flat terrain. The model for this species reflects its use of habitat for nesting. Parameters in this model are: size of habitat block (V_1), slope of habitat block (V_2), percent of surface covered by rocks (V_3), shrub community (V_4), percent shrub canopy cover (V_5), and average height of shrubs (V_6).

- **Rufous-sided/Green-tailed Towhee**

Rufous-sided towhees use brushy areas in lower elevations while the green-tailed towhee use more mesic, higher elevation brushy habitats up to 10,000 feet. A model for towhees was developed by modifying the HEP model for the Brewer's sparrow. The model reflects habitat use during the breeding season for both species and potential wintering habitat for the rufous-sided towhee. Parameters in this model are: size of habitat block (V_1), percent of surface covered by rocks (V_2), shrub community (V_4), percent shrub canopy cover (V_5), and average height of shrubs (V_6). Variable V_2 was not used because slope did not affect towhee habitat suitability.

HSI values were calculated for vegetation areas for the study area prior to disturbance. The results of these calculations for the five species are shown in **Figures 3-12, 3-13, 3-14, 3-15 and 3-16**. Total HUs of the study area were also calculated for each species (**Table 3-5**). A brief description of the HSI for each species follows.

Table 3-5 Total Habitat Units (HUs) for Species on the Project Area Prior to Mining Disturbance

SPECIES	TOTAL HUs
Sage grouse	501
Blue grouse	155
Mule deer	276
Brewer's sparrow	384
Towhee	475
TOTAL	1,791

Sage grouse: For this species, HSI ranged from 1.00 on the windswept ridges of the low sagebrush/blue-bunch wheatgrass vegetation type to 0.69 in the big sagebrush/-snowberry/basin rye grass type. Excessive snow depth and unsuitable habitat limited suitability in other areas. Total HUs prior to mining disturbance was 528 for sage grouse with 27 lost to existing mine disturbance.

Blue grouse: HSI ranged from 0.75 in the mountain-mahogany/mountain sagebrush/-snowberry vegetation type to 0.30 in the big sagebrush/snowberry/basin rye grass type. Habitat suitability was limited to areas within 0.5 miles of the Douglas fir stands. While suitable feeding and brooding habitat existed elsewhere, areas of suitable habitat considered were reduced to these bands, due to the limited expanse

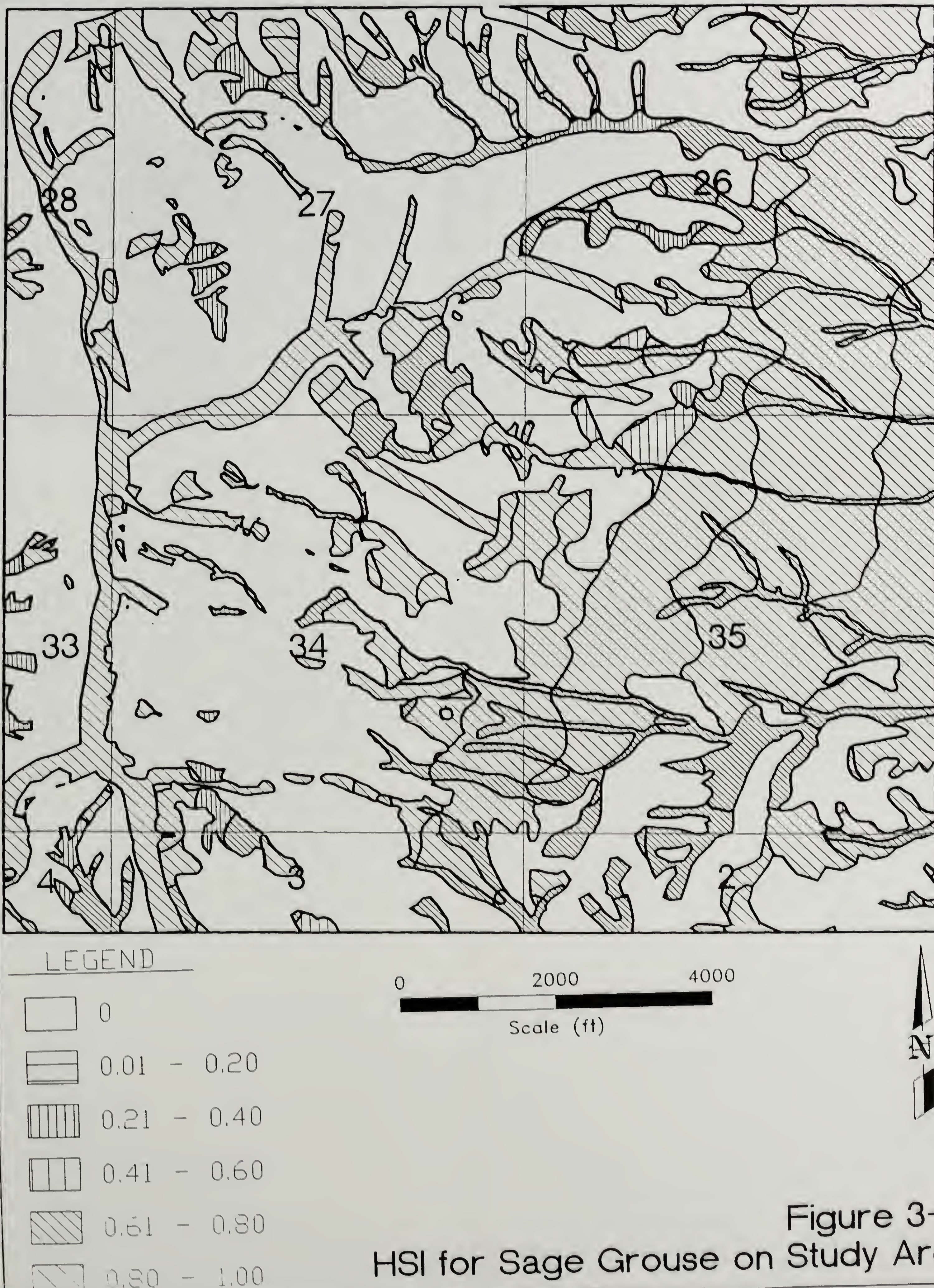


Figure 3-12
HSI for Sage Grouse on Study Area

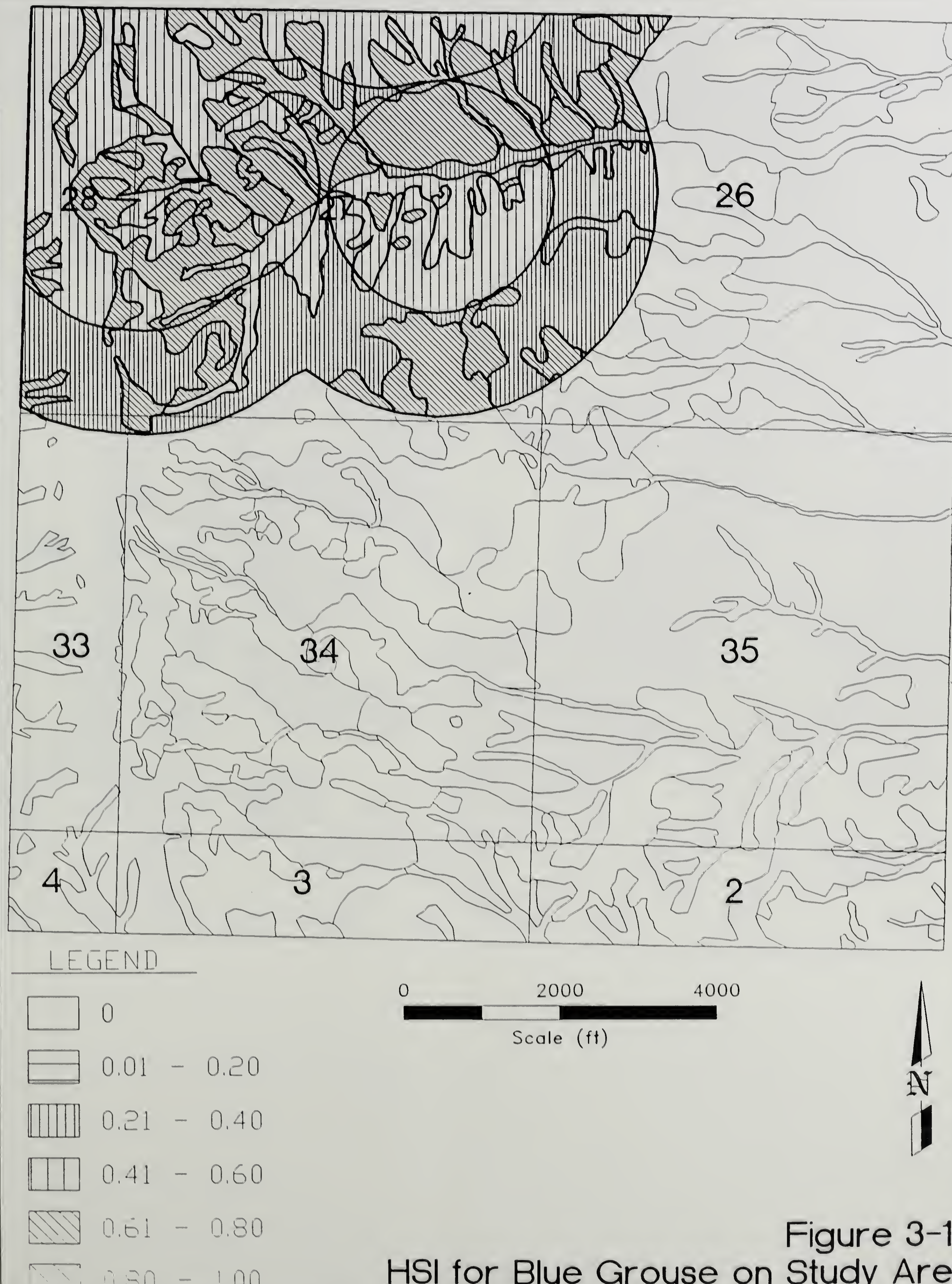


Figure 3-13
HSI for Blue Grouse on Study Area

Figure 3-14
HSI for Mule Deer on Study Area

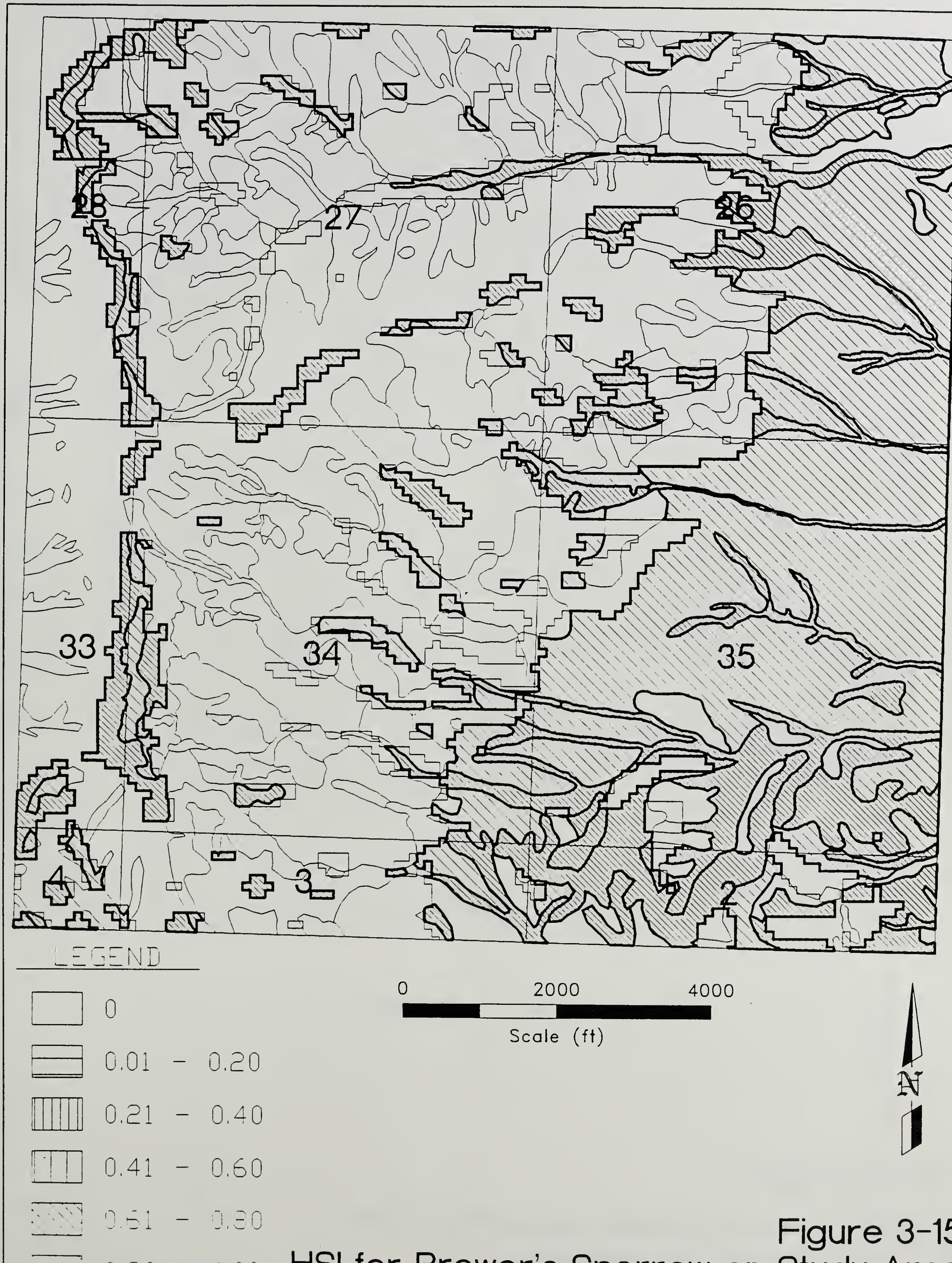


Figure 3-15
HSI for Brewer's Sparrow on Study Area

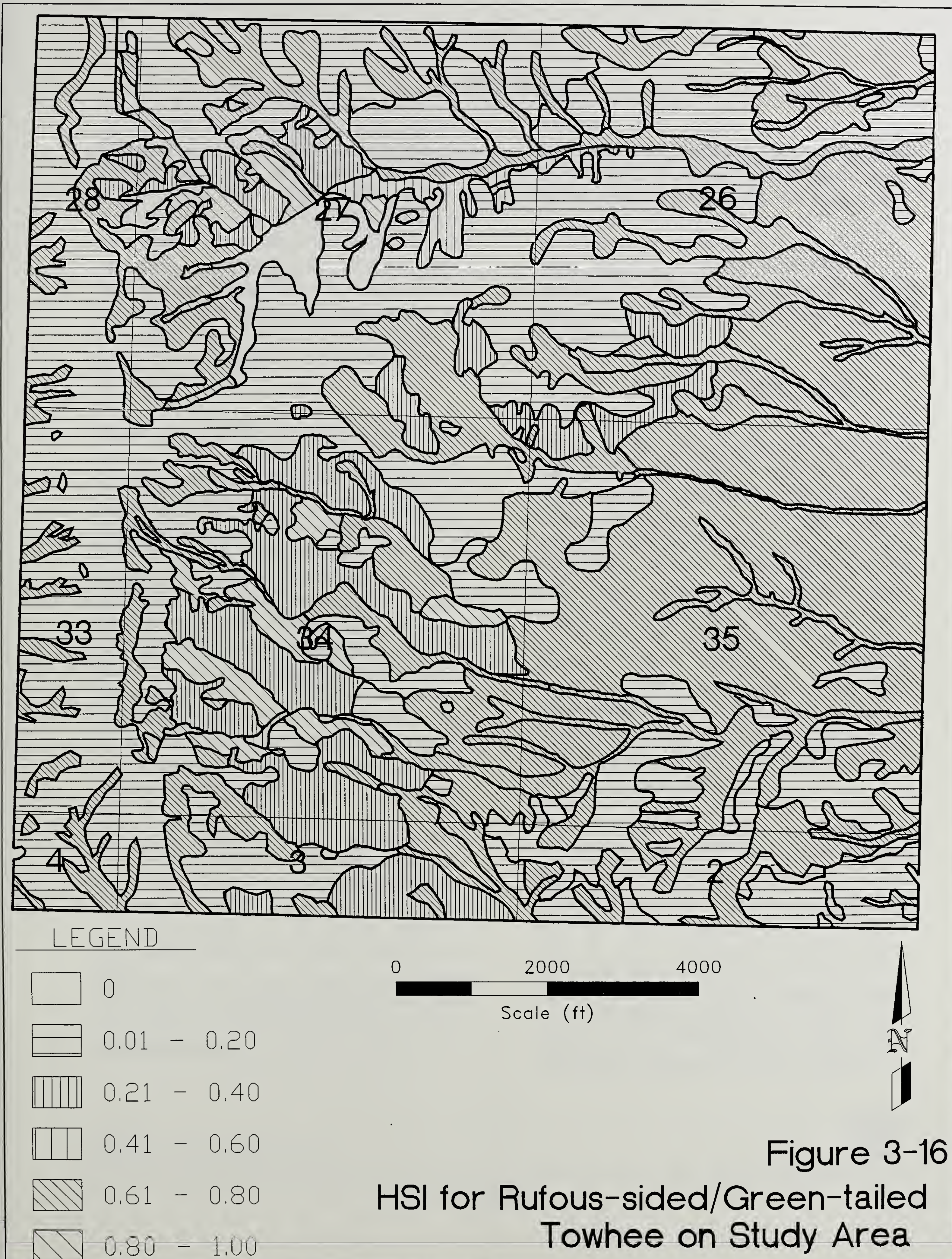


Figure 3-16
HSI for Rufous-sided/Green-tailed
Towhee on Study Area

of Douglas fir (important winter habitat). Douglas fir stands exist just outside the project area and influenced the HSI of areas on the north edge. HSI was set at 0.00 for areas over 0.5 miles from Douglas fir stands. Total HUs were 234 for blue grouse prior to mining disturbance. Existing mining disturbance has removed 36 HUs due to direct habitat destruction and an additional 43 lost in areas within 0.5 miles of a Douglas fir stand that was removed.

Mule deer: HSI for mule deer ranged from 0.89 in the mountain sagebrush/snowberry/spikegrass and big sagebrush/bitterbrush/blue-bunch wheatgrass vegetation type, to 0.03 in the juniper type with marginal snow depth. Since this model is for winter feeding, snow depth limited suitability in many areas. Vegetation composition limited HSI values to 0.43 along the windswept ridges, while HSI for the mountain-mahogany/blue-bunch wheatgrass type was 0.67 in areas with southerly aspect (0.00 otherwise). Total project area HUs for mule deer were 298 prior to mining disturbance with 22 lost to existing disturbances.

Brewer's sparrow: HSI ranged from a maximum of 0.87 in the big sagebrush/bitter brush/blue-bunch wheatgrass vegetation type to 0.70 in the big sagebrush/snowberry/basin rye grass type. HSI values were 0.00 where slopes exceeded 30 degrees or cover was too dense. Total HUs prior to mining disturbance for Brewer's sparrow was 399 with 15 lost to existing disturbances.

Towhee: HSI ranged from 1.00 in the mountain sagebrush/snowberry/spikegrass type and chokecherry/quaking aspen vegetation types to 0.05 in the low sagebrush/blue-bunch wheatgrass type. HSI was 0.00 in the Douglas fir type. Towhees had the most extensive habitat suitability in the project area. Total HUs prior to mining was 511 for towhees with 36 lost to existing disturbances.

3.2.5 Hunting in the Area

Big game and upland game bird harvest is regulated by the IDF&G. The Black Pine Mountains and Juniper Valley are both in Game Management Unit 57. In addition, Shoshone-Bannock tribal rights claim the Black Pine area as a traditional hunting area under their treaty. Upland game species which are currently open to hunting include black cottontail and pygmy rabbit, chukar, Hungarian partridge, mourning dove, and sage grouse, and sharp-tailed grouse. Mule deer and mountain lion are currently the only hunted big game species. Bobcat are also harvested as furbearing species.

These wildlife resources are extremely important because of their aesthetic and economic contribution to the area. The economic contribution was estimated by BLM in their Management Framework Plan in 1975. Projected revenues were estimated on an annual basis for the Deep Creek Resource Area and ranged from a low of $5,000 for chukar and sharp-tailed grouse, up to $400,000 for mule deer. Revenues generated from trapping of

furbearers, hunting of other species, and the aesthetic value of wildlife have not been estimated.

Of all the species, mule deer is the most important economically. Game management unit 57 is managed as a controlled permit or quality hunt. Each year, 450 permits are issued for mule deer harvest, of which ten percent are dedicated for non-resident hunters. Permits are highly sought after by non-resident hunters with their applications far exceeding those available permits. Overall hunter success averages about 50 percent and almost half of the bucks taken are four points or larger. With high deer populations and controlled low hunting pressure, this type of hunting experience is extremely valuable. Hunt statistics derived from questionnaire surveys for the 20 year period of 1967 to 1987 is presented in **Table 3-6**.

The Forest Service and IDF&G cooperated in some wildlife economic studies from 1983-1986 (Donnelly and Nelson, 1986; Young et al, 1987). These studies calculated the economic value of hunting trips for a 12 hour Wildlife and Fish User Day (WFUD). For deer hunting, this value was calculated at $49. As presented in **Table 3-5** during 1987, 383 hunters averaged three days per hunt. Using the calculated WFUD for the 1149 hunting days, the annual economic value for deer hunting in Unit 57 would be over $56,000. the value of a 12-hour WFUD for upland game hunting is calculated at $81. Upland game includes rabbit, pheasant, quail, grouse, wild turkey and dove. Records on upland game use are kept on a county-wide basis and analysis of day use in the project area can not be made, however, the major upland game use is associated with grouse hunting.

3.3 Socioeconomic Environment

The area surrounding the proposed project site is a predominantly rural agricultural region. The project site itself it located in the southeast portion of Cassia County, Idaho, but the socioeconomic area of influence includes Box Elder County, Utah and Oneida, Minidoka and Cassia Counties in Idaho. Box Elder and Cassia Counties and the communities of Burley, Snowville and Tremonton will be most directly affected while Oneida and Minidoka Counties will be less affected in terms of labor force, population and use of community services.

3.3.1 Land Use

The land in the socioeconomic area of influence is currently and has historically been a production region for cropland and grazing. It has also provided a base for mining, trapping, and recreational pursuits. Remnants of many abandoned mining camps occur in the area. Minerals that have been explored and mined in the general project region include gold, silver, copper, mercury and zinc. The early mines constructed canal systems to transport their ore. These canal systems were eventually used for irrigation.

Table 3-6
Mule Deer Harvest in Unit 57
1967-1987

			Deer Harvested						
Year	Permits	Hunters	M	F	Total	% Success Permits	% Success Hunters	Days/Hunter	Deer Seen/Day
1967			116	49	165				
1968			180	62	242				
1969			147	103	250				
1970	400		205	75	280	70			
1971	400		142	103	245	61			
1972	400		174	58	232	58			
1973	400		129	45	174	44			
1974	400		109	46	155	39			
1975	400		117	50	167	42			
1976	400		64	25	89	22			
1977	400	308	153	32	185	46	60	2.4	5.6
1978	385	284	103	20	123	32	43	2.4	6.2
1979	400	318	103	33	136	34	43	2.8	6.4
1980	400	329	156	27	183	46	56	2.5	7.4
1981	450	247	128	18	146	32	59	2.0	7.2
1982	450	358	168	46	214	48	60	2.4	10.5
1983	450	379	126	61	187	42	46	2.7	8.7
1984	450	372	73	36	109	24	29	2.6	7.5
1985	450	290	158	14	172	38	59	2.6	18.2
1986	450	213	135	17	152	34	71	2.5	12.2
1987	450	383	180	92	272	60	71	3.0	22.3

Agriculture is still the predominant land use in southern Idaho. In Cassia County, there are about 1,043,000 acres of pasture and range and 390,000 acres of cropland. These respectively account for 64 percent and 24 percent of the land in the County **Table 3-7**. In neighboring Minidoka County, rangeland accounts for 35 percent of the land, and agricultural land is another 48 percent of the total land in the County. Much of the land in these counties is federally owned and managed. The Forest Service manages the lands in the Sawtooth National Forest. The BLM manages other lands in the public domain. About 56 percent of the land in Cassia County is federally owned. Most of this land is managed for grazing by the BLM. In 1987 that rangeland supported 107,000 head of cattle.

Cassia County's main agricultural production comes from their developed cropland. That land produces potatoes, sugar beets, grains, peas, corn, alfalfa, beans and small seeds. Cassia County ranks third in Idaho in terms of total farm income. The value of agricultural production in Cassia County is over $100 million per year.

Most of the cropland in the study area is irrigated, since annual average precipitation ranges from 10 to 17 inches per year. The average size of an irrigated farm today is 312 acres which is up from 80 acres twenty years ago. Sources for irrigating water include stream run-off, which is stored in small reservoirs and water from deep wells.

Processing of agricultural products adds to the agricultural economy of the region. Burley, the county seat of Cassia County, has large potato, sugar beet and fresh vegetable processing plants that employ over 6,000 workers. These plants produce dry packaged foods and fresh frozen items that were valued at over $82 million in 1986.

Livestock production is another key element of the agricultural economy of the region. There are several commercial beef cattle feedlots. There are also dairy, sheep and swine production operations in the region.

3.3.2 Population

The population in the socioeconomic area of influence is a fairly stable one. There were about 78,870 people in the four counties (Cassia, Minidoka and Oneida in Idaho and Box Elder in Utah) around the project in 1990. Cassia County, in which the proposed project site is located, has approximately 19,532 people. About 42 percent of the Cassia County population lives in Burley, the county seat and largest city. About seven percent of the population lives in the four outlying communities of Oakley, Declo, Albion and Malta. The rest of the population in the county has a rural address.

Population densities in the study area are quite low. In Cassia County there are 7.6 people per square mile. Box Elder County is very similar, with a population density of 6.6 people per square mile. The popu-

Table 3-7
Land Use and Ownership

	Cassia County	
	Acres	Percent
Land Use		
Pasture and Range	1,043,000	64
Cropland	390,000	24
Forest	183,000	11
Other	12,000	1
Land Ownership		
Federal	911,450	56
State	56,701	3
County/Municipal	2,396	1
Private	657,357	40
	1,627,904	

1986 Data for Cassia County

Source: Region IV Development Association, Inc.
University of Idaho - Cooperative Extension Service

lation distribution shows a fairly high percentage of the population less than 18 years old. For Cassia and Box Elder Counties, 40 percent of the population is less than 18 years old, 51 percent is between 18 and 64 and only 9 percent is over 65 years. The average family size is between three and four people. Many of the families in the study area descended from the early Mormon pioneers. The people tend to be politically conservative and have a deep involvement with church, service, fraternal, recreation and civic activities. Approximately 72 percent of the population are members of the LDS church.

Approximately 9.9 percent of the study area population is of Spanish descent or other races. There are several Indian tribes in the region.

There are 6,120 households in Cassia County and the average per capita income in 1990 was $15,774. That is above the state average of $15,255 but below the national average of $18,689. Idaho ranks 37th in the nation in terms of per capita income.

Idaho along with many other western states has been steadily increasing in population. The statewide increase in population was 32 percent from 1970 to 1980 and was 6 percent from 1980-1985. Statewide population is about 1,005,000 people. The study area has also been increasing in population. In 1970 the population of the four county region was 67,112; that figure had increased to 75,903 by 1980 and 78,870 by 1990. Box Elder County in Utah is the largest county with 36,485 people. Minidoka County and Cassia County are similar in size with populations of 19,361 and 19,532, respectively. Oneida is a smaller more sparsely populated area with 3,500 people. Box Elder County had the most significant growth rates in the area. Population in Cassia and Minidoka counties have increased steadily except for a slight decline from 1984 to the present. The population of Oneida County had remained fairly stable.

In Cassia County there are five communities with a population of at least 100 people; Burley, with a population of 8,750, Oakley with 730 and the towns of Albion, Declo and Malta each with a population from 200 to 350 people. In Minidoka County, Rupert is the largest town with 5,340 people. Heyburn has a population of 2,970, Paul has 920 and both towns of Acequia and Minidoka have populations of 90. Malad City is a major community in Oneida County with a population of 2,020. Box Elder County, Utah has over 15 towns and cities with a population of at least 100. Brigham City is the largest with 16,150; Tremonton has a population of 4,410; and Snowville, the town closest to the project site, has a population of 240.

3.3.3 Employment

In the four counties comprising the study area, there is a labor force of 40,654 people. That labor force has remained fairly constant since 1980, after experiencing significant growth in the 1970's. Agricul-

ture is, as stated previously in this report, the main force of the economy in this region. More than half of the people employed in the region work in the agricultural sector.

Data on labor force participation is included in **Table 3-8**, which shows data on labor force, number employed, number unemployed and percent unemployed for the four counties in the study area for the period of time from 1970 to 1987. The largest labor force in the study area is in Box Elder County with 17,426 followed by Cassia County with 11,428, Minidoka County with 10,393, and Oneida County with only 1,407 individuals. The labor force increased significantly in Box Elder County from 1970 to 1983. It has risen slightly from 1985 to the present. The labor force has increased only slightly in Cassia County since 1975. The labor force in Oneida County has remained fairly stable.

In 1980, Cassia and Minidoka counties had their lowest levels of unemployment. In 1986, both Cassia County and Minidoka County experienced their highest levels of unemployment. The percentage of unemployed in Box Elder County decreased significantly from 1982 through 1986 and increased slightly in 1990.

Besides agriculture, other sectors that have contributed to employment in the region are manufacturing, trade, and government. In Cassia County, major employers include; Ore-Ida Foods, Del Monte, The South Idaho Press and Boise Cascade. Burley has six potato, sugar beet and fresh vegetable processing plants that operate 11 months of the year and employ over 6,000 workers. Major employers in Minidoka County include; Kraft, Amalgamated Sugar, Magic Valley Foods and J.R. Simplot. Wholesale and retail trade account for 22 percent of the total non-agricultural employment in Minidoka County. Box Elder County in Utah has a very high number of employees in the manufacturing sector, which constitutes about 50 percent of all non-agricultural work. Morton Thiokol, Inc. employs over 5,500 people in their plant near Howell Utah and Lazy Boy chair manufacturer in Tremonton employs 785. Other major employers include Vulcraft and American Greeting Corporation.

3.3.4 Community Services

Housing

The current supply of housing units throughout the study area appears to meet the demand for housing. There are 7,250 year round housing units in Cassia County and about 2,900 of these are in Burley. There are also about fifteen large apartment complexes in Burley and several duplex developments. The vacancy rate in Burley reported in the 1990 Census was 9.2 percent for the county and 9.6 percent for the Burley Division. As a result, there should be approximately 660 vacant units. The value of homes in Cassia County has dropped in the last two to three years. The average value of a residential structure in Burley is $45,000. The average

Table 3-8
Labor Force/Unemployment

	1980	1983	1986	1990
Cassia Co.				
Labor Force	10,818	10,648	10,562	11,428
Employed	10,126	9,775	9,601	10,434
Unemployed	698	873	961	994
% Unemployed	6.4	8.2	9.1	8.7
Minidoka Co.				
Labor Force	9,950	9,422	9,673	10,393
Employed	9,303	8,763	8,909	9,604
Unemployed	646	660	764	790
% Unemployed	6.5	7.0	7.9	7.6
Oneida Co.				
Labor Force	1,492	1,415	1,353	1,407
Employed	1,425	1,344	1,281	1,348
Unemployed	67	71	72	59
% Unemployed	4.5	5.0	5.3	4.2
Box Elder Co.				
Labor Force	16,814	15,873	16,505	17,426
Employed	15,893	15,161	15,829	16,681
Unemployed	921	711	676	745
% Unemployed	5.5	4.5	4.1	4.3

Source: Idaho Department of Employment
Utah Department of Employment

value of homes and land in the outlying parts of the county is $60,000, including land.

In Minidoka County there are 7,140 year round housing units and there are 1,500 in Oneida County.

Motel rooms provide the most common supply for temporary housing. There is a current supply of over 700 motel rooms in the four county study area.

Community Services

The communities around the proposed project area provide a variety of health, welfare and protection services. The largest communities in the area are Burley, Idaho and Brigham City, Utah. These two communities can provide most of the services and shopping opportunities to fill most needs. Smaller communities provide some services to meet basic needs. **Table 3-9** lists these and other communities and their distance from the project site.

Schools

There are a total of 15 schools in Cassia County providing education from Kindergarten through High School. These are administered through three joint school districts. Total enrollment in Cassia County schools was 5,177 students as of December 1987. High schools are located in Burley, Declo, Oakley and Malta. Elementary schools are at Burley, Albion, Almo, Declo, Malta and Oakley. The proposed mine expansion is in the area of Joint School District #151.

Community education programs are offered in Burley and Malta. The curriculum is coordinated with the College of Southern Idaho and Idaho State University. High school graduates in Cassia County comprise 72.7 percent of the population.

Transportation

The major transportation route to access the mine site is I-84 which provides access from Burley to the north and Tremonton to the south. I-15 connects Brigham City to I-84 at Tremonton. Idaho highway Route 77 connects Declo, Albion and Malta and provides a connection to I-84. Idaho Highway Route 81 connects Declo to Malta and then provides a connection to I-84 at Sublett. Although the project is located in Cassia County, access to the site will be on Oneida County roads, Utah Highway 30 in Box Elder County, Utah, and BLM roads (Black Pine Well Road No. 3601 and Goldmine Road No. 16701A).

Fire Protection

Fire protection is generally provided by special fire protection districts. There are five fire protection districts that cover Cassia County. These are the South Burley Fire Protection District, the North Cassia Rural Protection District, the Albion Fire Protection District, the Oakley Fire Protection District and the Raft River Fire

Table 4-2
Total Habitat Units (HUs) for Each New Disturbance Area Per Year

	Brewer's Sparrow	Towhee	Blue Grouse	Sage Grouse	Mule Deer	Total
J-Pit Haul Road	0.57	3.24	5.82	1.57	3.89	15.09
E-Pit Haul Road (Proposed)	0.23	2.67	1.85	2.64	3.88	11.27
E-Pit Haul Road (Alternative 3)	0.98	2.04	2.24	2.12	5.19	12.57
C/D Waste Dump (Proposed)	8.87	7.54	0	10.10	5.25	31.76
C/D Waste Dump (Alternative 2)	7.70	5.73	0	8.43	2.34	24.20
C/D Pit	4.33	21.80	0	12.05	20.88	59.06
E Pit	3.08	2.38	1.01	5.41	9.82	21.70
J Pit	0.25	1.42	4.62	0.55	2.59	9.43

Protection District. Fire protection for the project area is currently provided by the Forest Service and BLM.

Police Protection

Police protection is provided by county sheriffs for most of the study area. Police protection in larger cities is provided by their own municipal police forces.

Health

There are four hospitals within the study area. These are located in Burley, Tremonton, Malad, and Brigham City. Most of the small communities have EMT (Emergency Medical Technician) and ambulance service. Cassia Memorial Hospital in Burley has 42 beds.

Water and Waste

Many of the towns have public water systems and Burley, Declo, Albion, Tremonton and Brigham City all have modern sewer treatment facilities. Cassia County has a solid waste disposal plant where the solid waste is burned, which in turn, generates steam and supplies power to a local potato processing plant.

3.3.5 Taxes

Taxing districts in Cassia County support the county, municipalities, schools and special districts. Special districts in Cassia County included the Raft River Flood District, the Raft River Highway District and the Raft River Fire District. Taxes collected in Cassia County in 1986 are shown in **Table 3-10**.

Currently in southern Idaho, the average property tax is limited to one percent of the market value. The decrease in tax revenue has hurt the budgets of most municipalities forcing limited funds to be used for operation costs rather than maintenance and repair of community facilities. The state sales tax in Idaho is five percent. There are no special sales taxes in Cassia, Oneida or Minidoka Counties.

Table 3-10
Cassia County Taxes

	Real Property	Personal Property
County	$5,736,818	$3,490,016
Cities		
Albion	11,927	348
Burley	472,966	26,440
Declo	6,031	1,568
Malta	3,451	522
Oakley	9,563	411
School Districts		
#151	2,729,455	1,610,254
#331	75,444	6,215
#381	34,407	1,951
Assessed Property Value for Cassia County in 1991		
Net Taxable Value	$545,385,478	

Chapter 4

Environmental Consequences

4.0 Environmental Consequences

This chapter describes the environmental consequences that would be realized by implementation of the proposed Black Pine Mine Expansion and alternatives. The evaluation of consequences discloses the anticipated impacts to all of the environmental resources identified in Chapter 3. Emphasis is given to the issues that were identified for the project through scoping. These issues are identified in Chapter 1 and are described in more detail in the significance criteria identified in this chapter for each resource.

4.1 Physical Environment

4.1.1 Geology

Significance Criteria: Project must not create unstable structures or landforms, or structures that have a low risk of failure but severe consequences should failure occur.

Impacts of Action Alternatives

Site geologic impacts would result from development of the proposed mine pits. Since the pit locations, size and configuration are the same for the three action alternatives, potential geologic impacts would be the same for Alternatives 1, 2, and 3. These impacts would be limited to the removal of the material currently occupying the pit locations and the resulting change in site topography. Over the lifetime of the proposed mining project, approximately 3 years, 9.8 million tons of ore and 15.8 million tons of waste rock would be removed under all action alternatives.

In addition to the pits, the other structures that would be created by this project include the waste dumps, roads and the raising of the height of the existing leach pad. Only two waste dumps are associated with any of the action alternatives, the C/D Waste Dump and the Alternative C/D Dump. All other waste rock would be placed in previously mined pits. Both of the potential dumps are located relatively low on the slope on relatively flat areas where the dumps would have a stable base foundation. While only one of these dumps would be built, both waste dumps would avoid the steep foundation slopes where stability would be a concern.

Haul roads would also be constructed to access the proposed pits. These roads would be constructed to Forest Service and MSHA standards and are expected to be stable. Also, they would be recontoured and reclaimed after project completion.

A preliminary evaluation of the vertical expansion of the leach pad was conducted. The initial pad design incorporated excess capacity as an integral component. No technical obstacles were foreseen associated with raising the pad an additional 50 feet above the current 100 to 150 design heights (Golder Associates, 1993). Final design will be based on the results of compression testing of the liner, solution

balance modeling, and slope stability modeling of the embankments to ensure compliance with state and federal standards.

Impacts Specific to Alternative 4 -No Action

No impacts to site geology beyond those associated with the approved mine plan would occur if the no action alternative is implemented.

4.1.2 Soils

Significance Criteria: Project must not reduce soil productivity to the degree that successful reclamation and revegetation of affected areas would be precluded.

Impacts of Action Alternatives

The impacts to soils resulting from implementation of the Black Pine development alternatives would generally be confined to the areas of surface disturbance. Impacts may include increased erosion potential, loss of soil structure, potential decrease in fertility, and possibly compaction. These may occur in the pit areas and along the haul and access roads.

A soil erosion assessment was undertaken to determine amounts and types of erosion in the proposed project area. The area is currently covered with vegetation ranging from browse and shrubs to sagebrush and junipers, and offers moderate protection against erosion. Surface soils in the area consist mostly of loams and gravelly loams with moderate permeability and moderate resistance to erosion.

Increased wind erosion would also be realized in the exposed areas and most specifically from those areas receiving heavy traffic (haul roads, pit operations). The quantification of wind erosion potential is discussed in the air quality section as fugitive dust.

Under all action alternatives, bare soil resulting from pit and waste dump excavation, and road construction would be almost identical. For Alternative 1, 254.7 acres of bare soil would be exposed to potential erosion; for Alternative 2, 248.7 acres; for Alternative 3, 254.5 acres.

The Universal Soil Loss Equation (USLE) was used to estimate the average rate of gross soil erosion both before and after the mine expansion. The USLE predicts annual losses from sheet and rill erosion using the following equation:

$$A = R * K * LS * C * P$$

where:

A = annual soil loss (tons per acre)
R = rainfall and runoff factor
K = soil erodibility factor
LS = topographic factor
C = cover and management factor
P = support factor

The major difference in amounts of potential erosion prior to and during mining expansion operations is caused by addi-

tional bare ground. As a result, the only change in the USLE calculations is with the cover and management factor. The rainfall and runoff factor R was estimated to be 20. A soil erodibility factor of 0.37 was chosen to be representative of the site. The soil erodibility factor depends on the grain size distribution, soil structure, and permeability. Values of K range from 0.25 to 0.50 for loamy textured soils. The topographic factor LS is a function of the slope and length of slope. Using an estimate for the average slop[e length of 1,000 feet and an average slope of 17 percent, an LS value of 9.65 was obtained. A support practice factor of 1.0 was used since no support practice such as terracing would be in effect.

Using the above factors, the average annual gross erosion for the site was calculated to be 1.90 tons per acre per year under native vegetation, and 2.14 tons per acre per year when soil would be exposed during mining expansion operations. This results in an increased annual erosion potential of 0.24 tons per acre per year.

The disturbed acreage is similar for each action alternative. The potential soil erosion would show the following annual increases over native vegetation conditions: Alternative 1, 61.13 tons/year; Alternative 2, 59.71 tons/year; and Alternative 3, 61.08 tons/year. This erosion potential represents the maximum that may occur at one time.

Soil from the excavation of pits and waste dump construction would be removed and placed in stockpiles, which would be immediately vegetated with a rapidly germinating type of vegetation. The pits would be excavated such that runoff flows would be directed toward the center of the pits to eliminate possible offsite sedimentation. These measures would significantly reduce the erosion potential for each action alternative.

During operation, several measures would be taken to reduce erosion including road drains, road watering, sediment basins, water diversions, mulching, and temporary revegetation of soil stockpiles. Following the operational phase of the project, final reclamation would take place returning the project area to productive conditions to the extent possible. Section 4.2.1 - Vegetation, describes the revegetation plan that will be implemented for the project. This would involve grading to approximate original contour, to the extent practical and feasible, in all areas except the pits and dumps, redistribution of stockpiled soil, and the permanent revegetation of these areas. At this time, other soil impacts realized as the result of the project like compaction along transportation routes would be mitigated by ripping or other appropriate action.

Impacts Specific to Alternative 4 - No Action

Under the No Action alternative, there would be no changes in the potential soil erosion beyond those at the approved mine plan since there would be no new disturbed acreage.

4.1.3 Hydrology

Significance Criteria: Project must not cause toxic effluents to contaminate groundwater resources; nor cause any effluents to exceed Idaho State water quality standards; nor cause significant increases in surface runoff.

SURFACE WATER HYDROLOGY

Impacts of Action Alternatives

Effects of the proposed operation on the project area surface water hydrology would be similar for Alternatives 1, 2, and 3. There are no perennial or intermittent streams which would be affected, and waste rock characterization tests have indicated the absence of acid or toxic forming materials. Therefore, no impacts to surface water quality or hydrology would occur under any of the action alternatives.

Quantity of water flowing from this site may decrease slightly because of facilities location in the drainages and by their design. Historical drainage from the site would be maintained for up to a 25-year storm event. The mine pits would intercept and collect some of the site runoff. Other surface water flowing from disturbed areas would be routed to sedimentation control structures and then discharged. The pits would be excavated such that run-off would be directed toward the center of the pit.

Quality of water flowing from the site is not expected to be degraded. Sediment yield from the waste rock disposal areas may be decreased with the rock material protecting the site soils. Water quality of runoff from waste dump areas would not be chemically contaminated as waste rock tests have indicated the absence of acid or toxic forming materials; and operational and closure management techniques would reduce runon, runoff, and infiltration.

Results of ABA analysis indicate that the ore and waste from the pits are highly alkaline and contain very little total sulfur (**Table 4-1**). Thus, the acid-producing potential of waste and ore is negligible (Schafer & Associates 1993). One sample from E Pit had an ABA value of 19, indicating a neutral ABA potential. Mixing of this lower value ABA material during mining will increase its neutralizing potential.

Geochemical analyses, including whole rock analysis and leaching tests to simulate precipitation (EPA Method 1312), indicate that there is little risk of elevated metal levels in water leaching through these materials (**Table 4-1**). The EPA 1312 test is an unbuffered, synthetic rainfall extraction used for evaluating metal leachability from solid wastes. Again, because of lithologic and structural similarities the metal leachability for C/D Pit and J Pit are considered similar to B Pit. No leachable metal problems are anticipated.

Results from EPA Method 1312 leachability testing on materials from E Pit

Table 4-1
Acid Base Accounting and Metal Solubility of Samples from Proposed Expansion Pits

Location/ Sample No.	Depth (ft)	ABA	Metal Solubility (EPA Method 1312)											
			As	Cd	Cu	Fe	Hg	Mn	Ni	Pb	Se	Zn	Ca	Mg
B Pit														
BP-90-29	50-60	720	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	5.6	6.03
BP-90-29	70-80	515	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	0.002	7.81	2.01
BP-90-31	60-70	613	<0.049	<0.002	<0.003	0.026	<0.002	<0.001	<0.014	<0.031	<0.055	0.006	7.16	1.44
BP-90-31	110-120	640	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	9.89	0.822
BP-90-31	160-165	558	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	10.3	0.92
BP-90-33	95-105	769	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	0.005	5.61	4.13
BP-90-33	105-115	580	<0.049	<0.002	<0.003	<0.011	<0.002	<0.001	<0.014	<0.031	<0.055	<0.002	6.65	2.59
E Pit														
92BP-078	185	618	0.040	0.003	0.004	0.015	0.0002	0.005	0.010	0.041	0.064	0.009	6.59	0.899
92BP-078	220	566	0.040	0.003	0.004	0.030	0.0002	0.005	0.010	0.041	0.064	0.009	5.96	0.707
92BP-081	55	294	0.040	0.004	0.004	0.041	0.0002	0.005	0.010	0.041	0.064	0.010	5.34	0.951
92BP-081	90	905	0.040	0.003	0.004	0.021	0.0002	0.005	0.010	0.041	0.064	0.008	4.72	3.550
92BP-081	145	705	0.040	0.003	0.004	0.009	0.0002	0.005	0.010	0.041	0.064	0.005	5.90	0.504
92BP-082	25	291	0.040	0.003	0.004	0.019	0.0002	0.005	0.010	0.041	0.064	0.009	6.94	2.070
92BP-082	125	729	0.129	0.003	0.011	0.072	0.0002	0.005	0.012	0.041	0.064	0.010	7.24	5.670
92BP-082	175	19	0.145	0.003	0.004	1.970	0.0008	0.016	0.010	0.041	0.064	0.143	5.74	0.749
92BP-088	30	296	0.040	0.003	0.004	0.014	0.0002	0.005	0.010	0.041	0.064	0.007	5.86	1.030
92BP-088	125	701	0.040	0.003	0.004	0.012	0.0002	0.005	0.010	0.041	0.064	0.009	6.27	0.580
Maximum Contaminant Level (MCL) [from Cyanidation Permit]			0.05	0.01	1.0	Trend	0.002	Trend	0.013	0.05	0.10	5.0	Trend	Trend

exhibited very low metal concentrations. The majority of analyses were below instrument detection limits and maximum contaminant levels for drinking water (MCL). Two samples from drill hole 92BP-082 at footage intervals of 125-130 feet and 175-180 feet contained arsenic concentrations of 0.129 mg/l and 0.145 mg/l respectively. These values are above the MCL limit of 0.05 mg/l, but well below the EPA Method 1311 regulatory limit of 5.0 mg/l for classification as a hazardous waste (Schafer & Associates 1993).

Implementation of the project alternatives is not expected to exceed the significance criteria.

Impacts Specific to Alternative 4 - No Action

Under the No Action Alternative 4, no impacts beyond the existing operations would occur.

GROUNDWATER HYDROLOGY

Impacts of Action Alternatives

Potential impacts to the groundwater system resulting from development of the Black Pine mining expansion would not differ from the approved operation other than in duration. Excavation of pits and waste dumps would not intercept the water table. Impacts may be caused by withdrawal of water for operational uses. Groundwater impacts would be the same for all action alternatives.

The proposed mining operation would require extending the use of the local water supply. Since the mining process rate would remain the same, the demand on the local water supply would remain essentially the same. No more water would be consumed to water the new haul roads proposed in the expansion project, because the mining rate and number of trips would be similar to current conditions.

During periods of peak consumption, the anticipated maximum usage would be approximately 400 gallons per minute (gpm) for a short-term duration. The long-term average consumption is estimated at 50 gpm or less with actual usage highly dependent upon evaporation. Peak usage would occur during the summer when maximum evaporation occurs and roads are being watered to reduce fugitive dust. Very little consumption would occur during the winter months. The existing well would accommodate the demand of the expansion projects with no significant effects on the groundwater supply.

The leach pad would continue to be operated the same as it is currently. None of the monitoring wells around the pad have ever had any water in them indicating that no solution has been leaking from the pad. Therefore, no impacts to groundwater are anticipated from continued pad operation.

The groundwater would continue to be monitored closely to ensure that no con-

tamination occurs from the project operation. **Appendix C** contains the groundwater monitoring plan for the project.

Impacts Specific to Alternative 4 - No Action

The no action alternative would not have additional impacts on groundwater beyond those of the existing project since without the construction of longer haul roads, extra demand to water the roads would not be incurred.

4.1.4 Climatology and Air Quality

Significance Criteria: Project must not cause particulate emissions (PM-10) beyond the project boundary in excess of State and Federal allowable levels.

Impacts of Action Alternatives

Only particulate matter, much of which would be natural dust, would be emitted from the proposed mine expansion in noticeable enough quantities to result in an impact on the local air quality. While small amounts of other pollutants (gaseous tailpipe emissions) would be released into the atmosphere as a result of the expansion, these emissions are not expected to have a quantifiable effect on the air quality. Thus, the impact from these other pollutants will not be evaluated in any further detail.

The state of Idaho and the United States Environmental Protection Agency have established National Ambient Air Quality Standards (NAAQS) for "criteria pollutants" to protect the public health and welfare. PM_{10}, defined as "particles with an aerodynamic diameter of 10 microns or less", is the present criteria pollutant because particles of this size will penetrate deeper and remain longer in the lungs than the larger particulates. Accordingly, PM_{10} has replaced Total Suspended Particulate as a primary criteria pollutant. The NAAQS for PM_{10} are 150 micrograms/cubic meter for any 24-hour averaging period, and 50 micrograms/cubic meter for the annual arithmetic mean. The 24-hour standard cannot be exceeded more than once in a year. PM_{10} generated by road dust from vehicular traffic, mining activities, diesel vehicle exhaust, and ore processing is the only criteria pollutant expected to be near a significant level for the BPMI project.

BPMI is currently operating under the Idaho Division of Environmental Quality Air Permit 0440-0018, issued June 26, 1992. Under the terms of the air permit, the following operating requirements are to be met based on the projected emissions and ambient air PM_{10} concentrations:

1) The maximum daily removal of ore and waste rock shall not exceed 46,000 tons per day.

2) Total tons (ore and waste rock) to be mined and hauled shall be reduced from a rate of 46,000 to 34,000 tons

per day on calendar days when crushing activity occurs.

3) No mining in or hauling to or from A Pit shall be allowed on the same calendar day that crushing occurs.

For the existing air permit, total emissions and ambient air concentrations were calculated for the period when B Pit is mined and the maximum daily ore and waste rock is 34,000 tons. Total project emissions, with maximum controls applied, were calculated to be 95.09 tons per year of PM_{10}. The PM_{10} in road dust and diesel vehicle exhaust constitutes 78 percent (58.72 tons per year from road dust and 12.39 tons per year from vehicle exhaust) of total emissions. The existing haul road length from B Pit to the processing facility of 7,250 feet. The remaining 23.98 tons are from various mining operations to include blasting, drilling, loading, dumping, disturbed area and stockpile wind erosion, and ore processing. To assess the air quality impact of the mine expansion, the only difference in emissions would occur from road dust and diesel exhaust resulting from longer haul road distances. These increases would not exceed permit levels nor the significance criteria.

Since the C/D Pit is considerably closer to the processing and waste dump areas than B Pit, emissions would be less than currently permitted. Therefore, there would no additional impact to air quality when only the C/D Pit is mined. Haul road lengths from E pit and J Pit would be 14,700 and 15,100 feet respectively. As a result, road dust and vehicle emissions would increase 202 and 208 percent respectively when E Pit and J Pit would be mined. During the period when J Pit would be mined, annual PM_{10} emissions would be 122.13 tons from road dust, 25.02 from vehicle exhaust, and remain at 223.98 tons from other mining operations. The annual PM_{10} emissions increase would be 76.79 tons when J Pit would be mined. During the period when E Pit would be mined, annual PM_{10} emissions would be 118.61 tons from road dust, 25.02 from vehicle exhaust, and remain at 23.98 tons from other mining operations. This would be an annual PM_{10} increase of 72.52 tons.

Under Alternative 2, the haul road lengths would be identical to Alternative 1. Therefore, the impacts would the same as under Alternative 1.

Under Alternative 3, annual PM_{10} emissions would be the same as Alternatives 1 and 2 when C/D and J Pit would be mined. However, annual emissions would be 37.69 tons more when E Pit would be mined, due totally to the much longer haul road lengths.

Impacts Specific to Alternative 4 - No Action

Under the No Action Alternative, emissions would remain at the permitted levels of the existing mining operation. Therefore, there would be no additional impacts due to the No Action Alternative, but current emissions would continue until the existing mining project is completed.

4.1.5 Visual Resources

Significance Criteria: Project components, following reclamation, must not violate the Visual Quality Objectives (VQOs) established for the area by the Forest Land and Resource Management Plan. If standards for existing VQOs are exceeded, the project would have to comply with the requirements of the Plan for such situations.

Impacts of Action Alternatives

All the action alternatives would cause similar kinds of visual impacts. The primary impact would result from removal of vegetation and soils and creation of pits, roads and dumps on the site. These changes would create contrasts in landforms, lines and color. It is the contrast of these components, when viewed against the more homogeneous face of the mountain range, that make the components appear out of place, hence their visual impact.

Visual simulations from several views of the proposed mine expansion were developed using computer digital image processing. Color photographs of the mine site were taken from mileposts 266 and 272 on I-84 as seen by northbound drivers. The photos from the Interstate were taken from 10:00 to 10:45 am on a partly cloudy day. Perspective drawings from the Interstate viewpoints were created from an existing computer aided design file and were used to assist professional judgement in establishing the locations and visual characteristics of the proposed mine expansion activities. The photographs were electronically scanned and converted to computer digital image files. The image files were manipulated to illustrate the proposed mine expansion and rehabilitation actions. Final visual simulations were output to 35 mm color slides and hard copy prints were made from the slides.

Figure 4-1a shows a northbound driver's view of the site from I-84 milepost 266 as it currently exists. **Figure 4-1b** presents a visual simulation of the same view with the proposed project in place. **Figure 4-2a** shows a northbound driver's view of the site from I-84 milepost 272 as it currently exists. **Figure 4-2b** presents a visual simulation of the same view with the proposed project in place. The most notable features of the proposed expansion project (Alternative 1) are the C/D Pit and waste dump, the E Pit haul road, and J Pit.
The primary differences between Alternative 1 and Alternatives 2 and 3 are the locations of the E-Pit haul road and C/D waste dump, respectively. For Alternative 2, the northern half of the E-Pit road would be less visible than Alternative 1. Alternative 3 would result in less visual impact in the C/D Pit and dump area because the C/D waste dump would be incorporated into the existing disturbance associated with the Tallman dump with no new disturbed area (visually) created for the dump.

The primary mitigation measure for the visual impacts is to revegetate the site following mining. However, revegetation is a difficult phenomenon to simulate in visual

simulations of middle ground and background landscapes. To address this problem, photographs were taken of typical components of the project and visual simulations were prepared of what reclamation may look like. This analysis is discussed in Section 4.2.1 - Vegetation.

After seeing how specific components can be reclaimed, it is easier to visualize reclamation of the whole site. **Figure 4-3a** shows the view of the proposed action from milepost 266 on the Interstate highway. **Figure 4-3b** shows the same view with simulated reclamation and revegetation three years after mining ends. Similarly, **Figures 4-4a and b** show the proposed site from milepost 272 and the simulation of reclamation three years after mining, respectively. The simulations of reclamation show the entire mine being reclaimed with approximately concurrent timing. In reality, portions of the impacted areas could and would begin being reclaimed as they are no longer needed and would therefore be more fully reclaimed than those components which would remain active until the close of mining. Consequently, some areas would be better reclaimed than others three years after the close of mining and could be even less visible than depicted in the simulation.

The proposed mine expansion is located on lands to which the Forest Service has assigned a VQO of "partial retention". This VQO allows results of activities to be visible, but not recognized as an unnatural occurrence and as visually subordinate to the characteristic landscape. This objective is to be met as soon after project completion as possible or within a maximum of one year.

Some of the components of the proposed mine expansion are considered to be in conflict with the VQO of partial retention in that some of the mine site appears as an unnatural occurrence on the face of the Black Pine range, and could also be considered visually dominant rather than subordinate. The walls of the mine pits (the C/D Pit in particular) would not meet the VQO in the long term and the open excavation and disturbance would not meet it in the short term.

Also, as discussed in Chapter 3, the disturbed areas would not be visually reclaimed within the one-year maximum allowed by the partial retention VQO. The other components should meet the VQO.

This situation creates a legal conflict between the 1872 Mining Law which authorizes mining on the site, and the VQOs identified in the Forest Land and Resource Management Plan and Forest Service regulations in 36 CFR 228.8(d) which direct the Forest Service to minimize disturbance. The Forest Land and Resource Management Plan requires that when the designated VQO cannot be met for legal reasons, an attempt must be made to meet the next lower VQO. In this case, for those components of the project that would not meet the partial retention VQO, the next lower VQO would be modification which allows the

Figure 4-1a View of Existing Site from I-84 Milepost 266

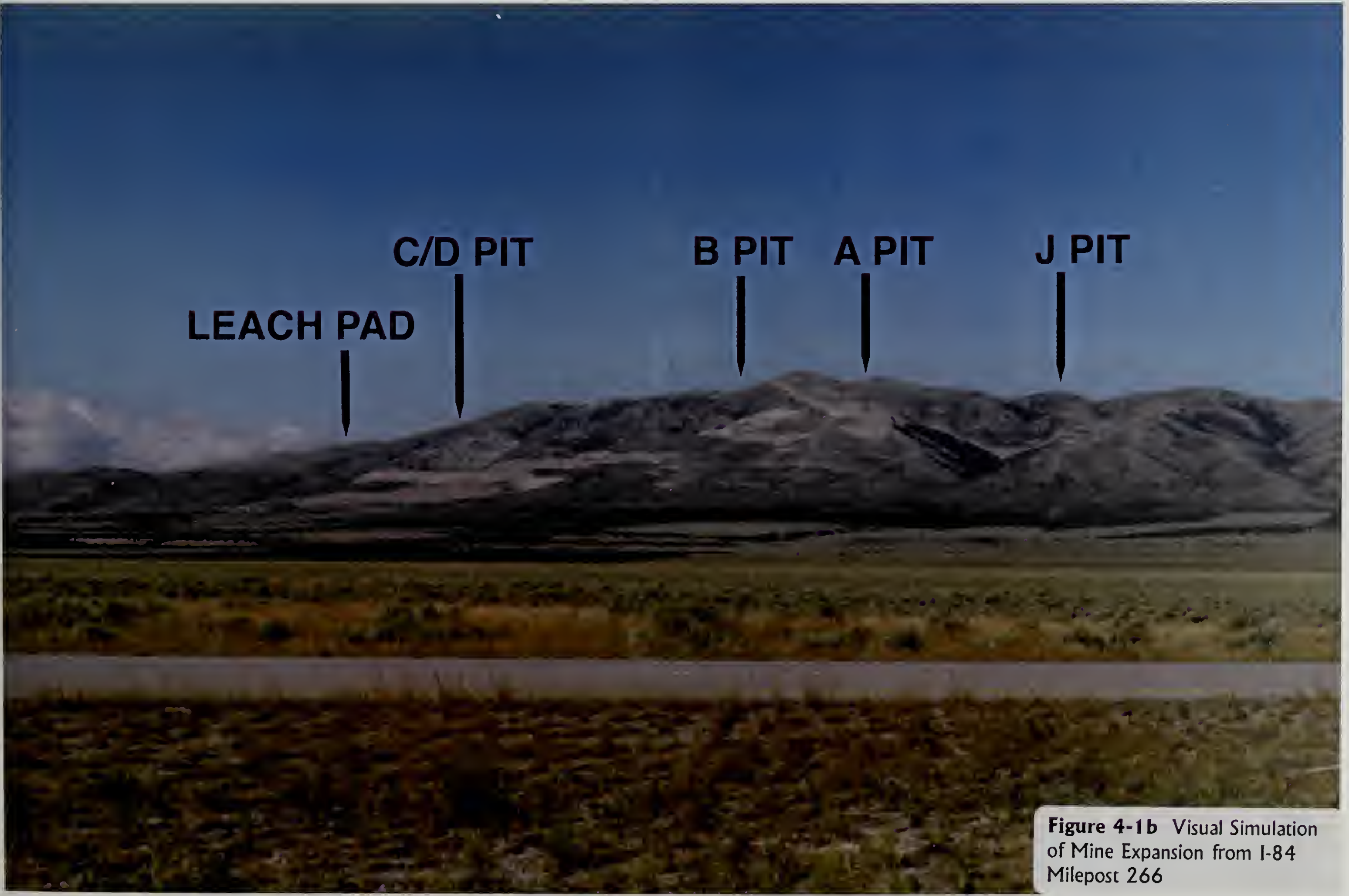


Figure 4-1b Visual Simulation of Mine Expansion from I-84 Milepost 266

Figure 4-2a View of Existing Site from I-84 Milepost 272

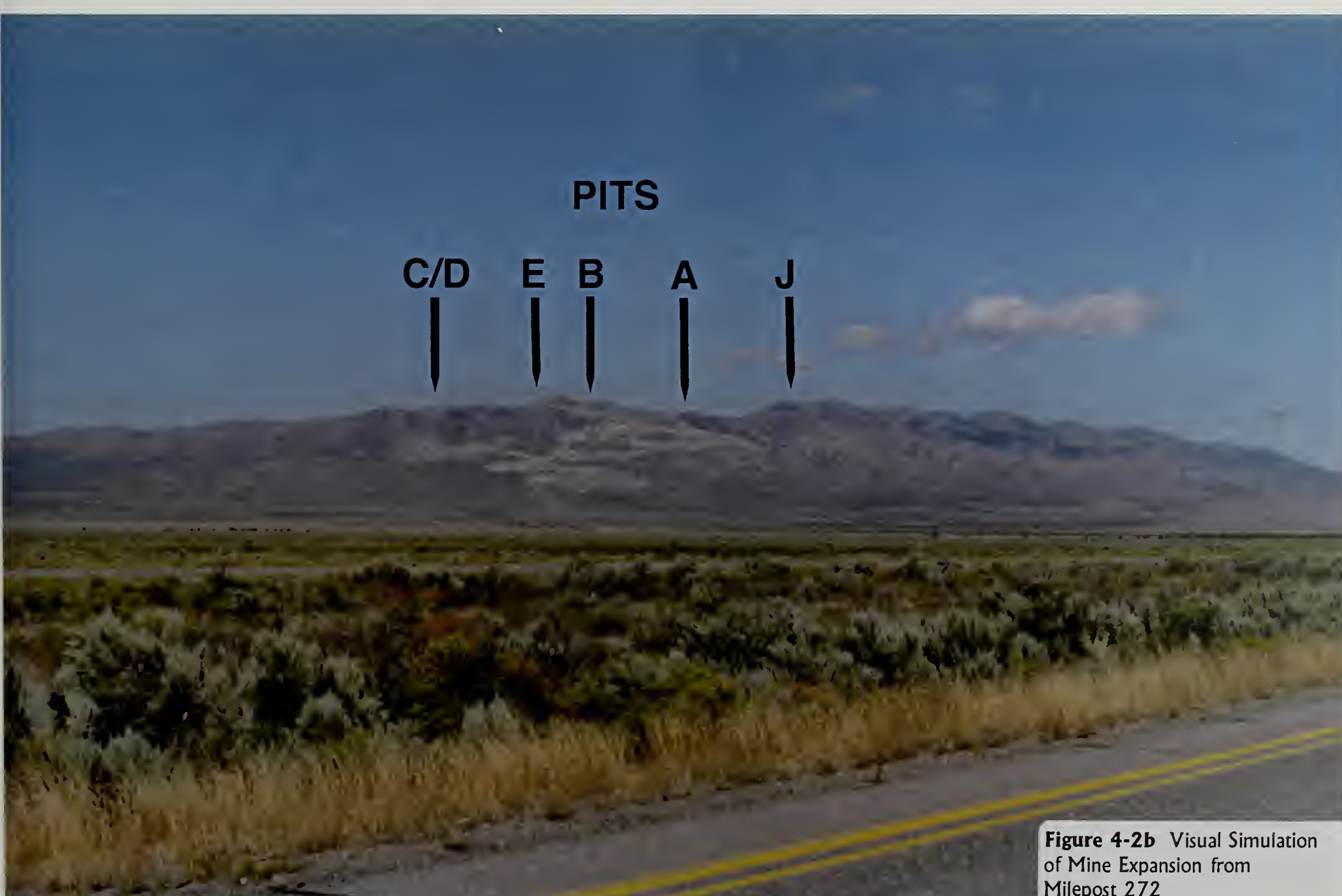


Figure 4-2b Visual Simulation of Mine Expansion from Milepost 272

Figure 4-3a Visual Simulation of Proposed Mine Expansion from I-84 Milepost 266

Figure 4-3b Visual Simulation of Proposed Mine Expansion from I-84 After Reclamation of Site

Figure 4-4a Visual Simulation of Proposed Mine Expansion from I-84 Milepost 272

Figure 4-4b Visual Simulation of Proposed Mine Expansion from I-84 Milepost 272 After Reclam. of Site

results of management activities to be seen and possibly dominate the landscape but should repeat natural patterns, if possible, within five years after the project completion.

All of the Black Pine Mine expansion components that do not meet the partial retention VQO should meet the modification VQO. The appearance of the pit walls should soften over time because experience on the site shows that the pit benches eventually crumble in selective areas and also that the rock exposed in the pit walls is variable in color and texture. Both of these features would make the pit walls more naturally appearing. All other open disturbance would be reclaimed and revegetation is expected to be successful within five years and would result in an appearance similar to that shown on the visual simulations.

Impacts Specific to Alternative 4 - No Action

The visual impacts of the no action alternative are depicted in Figures 4-1a and 4-2a which show the project as it currently exists. The existing project is readily visible but would be less visible after reclamation as **Figures 4-3b and 4-3b** show.

4.1.6 Cultural Resources

Significance Criteria: Project must not eliminate any sites potentially eligible for inclusion on the National Register of Historic Places (NRHP).

Impacts of Action Alternatives

The components of the mine expansion and alternatives are located in areas which have had clearance surveys conducted. The results of these surveys are described in Chapter 3.

All action alternatives would have a similar potential for disturbing cultural resources. Previous surveys (Metcalf Archaeological Consultants 1989 and Woods and Woods 1992) have indicated the site has a low potential for the occurrence of prehistoric artifacts and only somewhat greater potential for historic artifacts. As a result, the potential for disturbing cultural resources is considered low for all action alternatives.

None of the cultural resources which have been identified (eight historic, seven prehistoric) have been considered significant nor eligible for the NRHP. If any new cultural resources would be found during construction or operation of the proposed expansion, the resources would not be disturbed until the Forest Service have determined their significance. In this manner, the significance criteria would not be exceeded.

Impacts Specific to Alternative 4 - No Action

The No Action alternative would not disturb any additional areas beyond those already disturbed by the approved mining operation. The approved mining operation has not uncovered any additional

cultural resources in the three years that the site has been active.

4.2 Biological Environment

4.2.1 Vegetation

Significance Criteria: Project must not negatively impact any Federally listed threatened or endangered plant species.

Impacts of Action Alternatives

The impacts to vegetation within the BPMI mining expansion area would be tied to the type of vegetation which exists on each expansion facility (pits, waste dumps, and roads), and the area of surface disturbance that have been identified for each alternative (254.7 acres for Alternative 1, 248.7 acres for Alternative 2, and 254.1 acres for Alternative 3). Although the total surface disturbance is nearly identical for all action alternatives, differences in facility locations would result in dissimilar impacts. Under all alternatives, the location of the mining pits would be the same. Differences in impacts to vegetation would result from the location of the C/D waste dump in Alternatives 1 and 2, and the haul road to E Pit in Alternatives 1 and 3.

The vegetation on disturbed areas would be removed during construction as part of the site clearing. The majority of impact for all alternatives would take place within the sagebrush-grass community as it occupies most of the areas where surface disturbance is planned to occur and is the most abundant in the area.

The impact to vegetation from action alternatives would be directly related to the acres of surface disturbance for each alternative. The same is true for any lowered revegetation potential which might result from the surface disturbance. The proposed action (Alternative 1) would remove 124.5 acres of sagebrush-grass, 83.6 acres of juniper, 33.2 acres of mountain shrub, and 8.0 acres of conifer-mountain shrub. Alternative 2 would remove similar amounts of vegetation with the exception of 4.4 fewer acres of sagebrush-grass than Alternative 1. Alternative 3 would remove similar amounts of vegetation as in Alternative 1 with the exception of 0.3 acres more of sagebrush-grass.

No known threatened, endangered, or sensitive plant species would be impacted by any of the three action alternatives.

Most of the vegetation impacts that have been identified for each of the alternatives would be mitigated by the revegetation programs that would be implemented by BPMI. For the expansion project, the haul roads and dumps would be reclaimed while the pits would remain. Of the 254.7 acres to be disturbed for Alternative 1, approximately 78 acres would be revegetated. Of the 248.7 acres disturbed for Alternative 2, 72 acres would be reclaimed and 73 acres of 254.4 disturbed for Alternative 3 would also be reclaimed. Some post-construction revegetation would be implemented on topsoil stockpiles and

roadsides to stabilize these areas during the operational life of the project. Post-operation reclamation and revegetation would be designed to establish plant communities that are self sustaining and compatible with the planned post-mining land use, range and wildlife habitat. The revegetation objectives would be to achieve 90 percent of pre-mining forage production and use species that would blend in well with the color of the surrounding ecological complex. The final species mix utilized would be approved by the Forest Service and BLM. A reclamation performance bond covering the cost of reclamation would be deposited with the Forest Service by BPMI to ensure all proposed reclamation measures are carried out. Reclamation specifications would be included in the final Plan of Operations for the project. Implementing the mitigation measures is expected to result in acceptable revegetation.

BPMI will implement a reclamation plan that is based on reclamation units. These are physical units delineated to be managed individually for reclamation prescriptions/practices to meet the land use objectives and bond release criteria. The reclamation unit boundaries will be determined by ecological unit boundaries, the type of mining component, and the timing of reclamation.

To show how revegetation efforts would look after establishment, photographic simulations were prepared. To do this, photographs were taken of a typical exploration road, a typical haul road, and a typical waste dump, with each of these components in the foreground. Then, using a series of assumptions about physical characteristics, revegetation species and revegetation success, photo simulations were prepared to illustrate the anticipated visual recovery of these project components.

The assumptions used included:

Waste dump simulation: dump face will be regraded to 3H:1V, dump top will have 5 percent slope into hill, revegetation success estimated at 60-70 percent of adjacent native vegetation, topsoil will be slightly darker than native soil, and no trees will be planted. Simulation is after three growing seasons.

Exploration road simulation: Revegetation success estimated at 70 percent, although early success of cheatgrass may make it appear greater, and no trees will be planted. Simulation is after three growing seasons.

Haul road simulation: Top one-third (approximately) of cut slopes, and bottom one-third (approximately) of fill slopes will not be regraded and will show little successful revegetation, revegetation success estimated at 50 percent, and no trees will be planted.

Figures 4-5a and b show the existing condition of a typical exploration road and the same road three years after revegetation, respectively. **Figures 4-6a and b** show the existing condition of a typical haul road

and the same road five years after revegetation, respectively. **Figures 4-7a and b** show the existing condition of a typical waste dump and the same waste dump three years after revegetation, respectively.

Impacts Specific to Alternative 4 - No Action

Vegetation impacts beyond those that have already occurred as a result of exploration in the proposed expansion area, would not occur if the no action alternative were implemented. Alternative 4 (No Action) would ultimately impact 350 acres of vegetation, most of which has already been removed.

4.2.2 Grazing

Significance Criteria: Project must not create conditions where reclamation could not replace sufficient AUMs to meet land use objectives.

Impacts of Action Alternatives

Grazing resources on the Mineral Gulch Allotment would continue to be affected in the short-term by the closure of the entire permit area during the life of mine. This means the better part of three sections have been removed from grazing availability, however, some cattle still use the site. This short-term loss of grazing area amounts to 456 tons of forage (475 dry pounds per acre) which corresponds to 258 AUMs. However, as stated in Chapter 3, the current permittee does not utilize the north half of the allotment due to lack of water, so potential impacts to the permittee would actually be less.

Over the long-term, grazing resources would be impacted by the removal of various amounts of vegetation from 254.7 acres as described in the preceding section. Of the disturbed acres, 78 would be revegetated. All action alternatives essentially would remove the same amount of forage: 118,210 pounds. This amount of forage corresponds to approximately 33.5 AUMs. This loss is considered a long-term effect because it would take several growing seasons after mining is complete before forage levels are back to pre-mining conditions.

The actual impacts to grazing could be different than those estimated, as many of the expansion components are located at higher elevations where slopes are steep enough to inhibit cattle from grazing. Also, the lack of permanent water sources would further serve to reduce the amount of grazing in the area. It is expected that the permittee would not experience a loss of 33.5 AUMs because the north half of the allotment is not actively grazed.

In all cases, the impacts to grazing would be mitigated by the revegetation program to be implemented by BPMI. Any residual impacts to grazing would not be sufficient to exceed the significance criteria.

Figure 4-5a View of Typical Exploration Road - Existing Condition

Figure 4-5b Visual Simulation of Exploration Road Three Years After Revegetation

Figure 4-6a View of Typical Haul Road - Existing Condition

Figure 4-6b Visual Simulation of Haul Road Three Years After Revegetation

Figure 4-7a View of Typical Waste Dump - Existing Condition

Figure 4-7b Visual Simulation of Waste Dump Three Years After Revegetation

Impacts Specific to Alternative 4 - No Action

The No Action alternative would have impacts quite similar to the action alternatives. In the short-term, the entire permit area would be closed to grazing. In the long-term under the No Action alternative, vegetation would be removed from 350 acres, of which 237 would be revegetated.

4.2.3 Wildlife

Significance Criteria: Project must not negatively impact any Federally-listed threatened or endangered animal species; nor significantly affect mule deer migration to winter range; nor cause significant loss of sage grouse winter range; nor cause significant loss of early spring range for mule deer.

Impacts of Action Alternatives

Area wildlife populations would be affected by the proposed expansion due to loss of habitat and stress from human activities. All the action alternatives would remove vegetation and disturb areas in the mine site. The areas of disturbance vary slightly among alternatives. Potential effects on wildlife would be quite similar for all alternatives because the disturbance zone around areas of human activity can range from one-quarter to one-half mile or more, and would not vary much among the alternatives.

The amount of HUs that would be lost by the various project components were calculated for the five species that were evaluated. **Table 4-2** shows the HUs for each new disturbance associated with the expansion project alternatives.

Total habitat units lost by Alternative 1 would be 151.22 for the five species evaluated. Of this, would be 33.35 HUs for sage grouse which would be 6.6 percent of the total HUs available for this species in the study area. Also lost would be 13.3 HUs for blue grouse (8.6 percent of available), 46.7 HUs for mule deer (16.9 percent of available), 18.13 HUs for Brewer's sparrow (4.7 percent of available), and 39.74 HUs for the Towhee (8.4 percent of available). The HUs lost would result from direct habitat removal. Loss of portions of the Douglas fir stands in Mineral Gulch would reduce the HUs for blue grouse in other habitats by reducing the area within one-half mile of the fir stands.

There would not be any major differences in HUs lost among the different alternatives. Alternative 3 would disturb slightly more HUs for the five species (152.52) while Alternative 2 would impact slightly fewer HUs (143.66). The amount of HUs lost for any individual species would also not vary significantly amoung alternatives.

Lost HUs would be mitigated on a one for one basis. Mitigation could include revegetation, habitat improvements, off-site mitigation, or a combination of these and/or others.

Potential impacts to other forms of wildlife on the site are expected to be similar for

Table 4-2
Total Habitat Units (HUs) for Each New Disturbance Area Per Year

	Brewer's Sparrow	Towhee	Blue Grouse	Sage Grouse	Mule Deer	Total
J-Pit Haul Road	0.57	3.24	5.82	1.57	3.89	15.09
E-Pit Haul Road (Proposed)	0.23	2.67	1.85	2.64	3.88	11.27
E-Pit Haul Road (Alternative 3)	0.98	2.04	2.24	2.12	5.19	12.57
C/D Waste Dump (Proposed)	8.87	7.54	0	10.10	5.25	31.76
C/D Waste Dump (Alternative 2)	7.70	5.73	0	8.43	2.34	24.20
C/D Pit	4.33	21.80	0	12.05	20.88	59.06
E Pit	3.08	2.38	1.01	5.41	9.82	21.70
J Pit	0.25	1.42	4.62	0.55	2.59	9.43

all the action alternatives. The significance criteria would not be exceeded because there are no federally-listed threatened or endangered species in the area; local mule deer migration has already adapted to mining activities over the past two years and the migration corridor is at elevations much lower than where the expansion activities would occur; sage grouse winter range would not be affected as no such range occurs within a half mile of the overall project boundary; and no spring range for mule deer has been identified in the area of the Black Pine Mine Expansion project.

Potential impacts to wildlife would be largely mitigated by the reclamation and revegetation program which would be implemented following project closure. Revegetation of the site after cessation of mining would likely mean that wildlife would reinvade the area over time as vegetation becomes reestablished.

Impacts Specific to Alternative 4 - No Action

The No Action alternative would not create any new impacts beyond those of the existing mining operation, but would maintain current levels of noise and activity disturbance. The HUs lost for the five evaluated species would not increase over those levels that have been identified for the existing mining project.

4.2.4 Area Hunting

The Black Pine Mountains and Juniper Valley are both in Game Management Unit 57. Big game hunting in the area is for mule deer and mountain lion. Upland game hunting is for a variety of gamebirds and small mammals. Some trapping for bobcat also exists. Potential impacts from the mine expansion on hunting would take the form of either diminishing the hunting experience in the area, or preventing a hunter from coming to the area because he thought the area was too disturbed for good hunting.

Mule deer hunting is the most important from an economic standpoint. Permits are necessary to hunt mule deer in Unit 57 and 450 permits are issued each year. There is always an excess of applicants for the permits. The presence of the Black Pine Mine is not considered sufficient disturbance to the Game Management Unit that hunters would no longer apply for the permits. It is possible that hunters who hunt close to the mine area may react negatively to the activity and noise, however, the mine site itself is closed to hunting. No decrease in mule deer hunting is anticipated to result from the mine expansion.

The closure of the mine site may have more effect on upland game hunting than deer hunting. The majority of upland hunting is for grouse, and historic access roads in the area may have served grouse hunters for years. However, the mine expansion would not have any additional impacts on grouse hunters, as the site has

been closed to hunting since 1990 and hunters should have already adapted to the change in access to the area. While there have been some restrictions to the general public during hunting season, this area represents less than one percent of the area available to the public. **Figure 4-8** shows the current and proposed closure boundary for the mine.

The potential impacts on hunting would occur regardless of which action alternative was implemented. The No Action alternative would also have similar impacts on hunting because the existing mine operation would continue for at least three more years.

4.3 Socioeconomic Environment

Significance Criteria: Project must not cause any of the following:

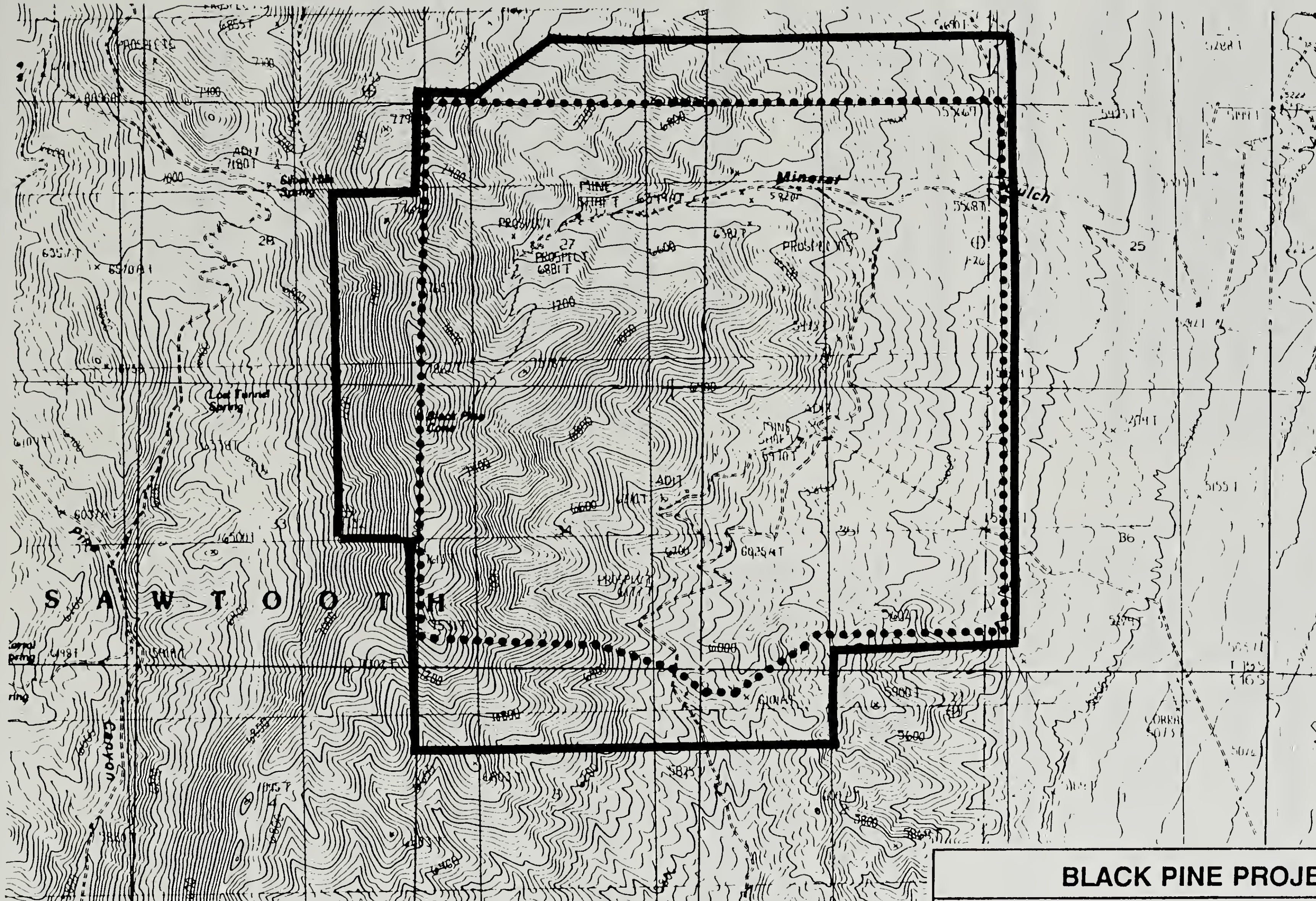
- more than 10 percent change in any county population,
- demand for temporary housing greater than 10 percent of supply,
- demand for permanent housing greater than 5 percent of supply,
- change a county's tax base by more than 10 percent,
- demand for a public service during construction by more than 20 percent of existing supply,
- demand for public services during operations which exceeds supply, and
- impacts to public safety.

Impacts of Action Alternatives

The proposed expansion is located totally within the exploration area boundary approved by the Forest Service in 1987 and 1989, and which was documented in an Exploration Project EA (Forest Service 1989).

Because the proposed expansion would occur in an area of existing mining operations in a remote area, would use existing personnel (approximately 85 employees for the most part) and existing mining equipment, and would not require the construction of new buildings or structures, no effects are expected to occur in the areas of population, employment, community services, housing, or taxes. Mine employment would only increase by a few personnel. The mine expansion would require the capital purchase of new 85-ton haul trucks, but that purchase would not affect local communities. However, maintenance supplies for the new trucks and the expanded operations could result in some unknown additional amount of local purchases of fuels, lubricants, and other supplies.

Impacts to public safety are not expected for the expansion project. The mine area has been closed to public access for the protection of public health and safety since 1991. The boundary of this area closure would be expanded to include the components of the expansion project (see **Figure 4-8**).



LEGEND

••••••••• Existing Closure Boundary

▬▬▬ New Proposed Closure Boundary

BLACK PINE PROJECT

Area Closure Boundary

FIGURE 4-8

The proposed project essentially represents an extension in time of the existing mining project. The existing mine life would be extended about three years, or until about 1999. Therefore, none of the socioeconomic significance criteria are expected to be exceeded, regardless of the alternative chosen.

Impacts Specific to Alternative 4 - No Action

Under the no action alternative, the existing mining project would continue as approved. Mining and its associated employment would end about 1996 without the 3-year extension associated with the expansion.

4.4 Mitigation Measures

The previous EA documents concerning this project site (Forest Service 1988, 1991) listed various mitigation measures which would be applied to construction and operation of mine pits, leach pads, waste dumps, and roads. Other mitigation measures were also identified specifically to address impacts to vegetation, transportation, air and water, topsoil, hazardous materials, wildlife, and cultural resources. These are identified in Chapter 2. Many specific mitigation measures would also be applied to the mine expansion, including:

a. Surface drainage would be routed around the C/D waste dump.

b. The C/D dump surface would be designed with a 5 percent slope to a diversion channel.

c. During winter operations, no snow or ice would be incorporated into fill areas that would decrease slope stability.

d. The C/D dump and leach pad would be recontoured to a 3:1 or flatter slope.

e. A dust suppressant would be used to reduce the potential for fugitive dust emissions during operations.

f. Revegetation seed mixes would be determined according to the component being reclaimed, and the ecological complex where the component was located.

g. No noxious weed species would be present in seeded areas at time of bond release.

h. Vegetation color would complement natural vegetation to the extent possible.

i. Bond would not be released on vegetation prior to achieving 75 percent of the cover of adjacent areas after four growing seasons. Determination will be made by site analysis transects, live perennial basal area, litter, and rock using range standards.

j. BPMI would continue their static water testing program for area wells and springs prior to and during mine expansion and operations.

k. Available topsoil and other suitable growing medium on proposed disturbed areas with slopes less than 40 percent would be stripped where practical and stockpiled prior to disturbance.

l. Topsoil stockpile locations would be identified and agreed upon prior to topsoil stripping.

m. As a minimum, soil and growth medium would be respread over disturbed areas to be reclaimed with slopes of 3:1 or flatter. Soil would be respread to a depth of not less than 8 inches, if sufficient soil is available.

n. After topsoil is respread, the soil would be analyzed and fertilized as needed to improve successful revegetation.

o. All hazardous materials would be handled in compliance with applicable state and federal regulation.

p. Firearms would be prohibited on the mine site to reduce the potential for harassing or killing wildlife.

q. Habitat Units (HUs) lost by implementing the expansion project would be mitigated one for one.

r. BPMI's Idaho Cyanidation Permit would have to be modified.

s. BPMI would continue sampling and testing of waste rock for acid-base accounting (ABA) and arsenic.

4.5 Unavoidable Adverse Impacts

Mitigation measures would be applied in all appropriate situations to ameliorate the identified impacts. However, some of the project components such as the mine pits would result in some net, residual impacts that could not be totally avoided, including the following:

- Minerals would be removed from the pits.
- Topography would be altered by the creation of the pits and dump.
- Local wildlife species would be displaced for the life of the project into adjacent, similar habitats.
- Soil erosion potential would be increased for the life of the project.
- Emissions of PM-10 would be increased for the life of the project.
- Many of the proposed expansion components would be visible from Interstate 84 during the life of the project and for the long-term. The number and magnitude of the visu-

al impacts may violate the Partial Retention VQO of the Black Pine Range but would meet the standards of the next lower VQO, Modification. After project completion, visibility of the waste dump, roads, and leach pad would be lessened by revegetation.

- A maximum of 255 acres of vegetation would be removed from production for the life of the mine expansion project, which represents less than 30 AUMs on an area-wide basis. However, given the steep slopes and lack of surface water in the area, fewer than 30 AUMs would be lost.

- The project would remove an average of 150 HUs for the five species that were evaluated if any of the three action alternatives were implemented. These HUs would be mitigated over the long-term by revegetation, habitat improvement, off-site mitigation, or a combination of these and/or others.

- The consumption of approximately 400 gpm of groundwater (as a maximum) would be continued for three more years, or until 1998. However, this consumption does not have any effect on other groundwater users.

4.6 Relationship Between Short and Long-term Uses of the Environment

Short-term uses of the environment are generally those which occur on an annual basis while long-term productivity deals with time spans of 50 years or more.

All the action alternatives would have both short- and long-term effects on the environment. In the short-term, resource productivity of the site would be reduced and land use would be altered. A similar short-term commitment of resources would also be made by the No Action alternative, but the short-term would end three years sooner than with the proposed action. After mining, the site would revert to its former land uses, and over several growing seasons, the productivity of the site would again approach pre-mining conditions. In the long-term, the site would have landforms and visual resources physically altered. The No Action alternative would not create any new kinds of environmental impacts beyond those that are already occurring as part of the mining project.

4.7 Irreversible and Irretrievable Commitments of Resources

Irreversible commitment of resources generally refers to non-renewable resources while irretrievable commitment applies to losses of production, harvest, or use of renewable resources. All the action alternatives would create irreversible effects on the topography and visual resources by the creation of the mine pits and dumps. There would also be an irretrievable loss of the minerals removed from the pits as well as the fuel used to extract and process them. All the action alternatives would create irretrievable effects on soils, vegetation and grazing where productivity would be decreased but would be mitigated in the long term following project completion by implementation of reclamation. The No Action alternative would also represent an irretrievable commitment of geologic material (ore), soil, vegetation and grazing resources, but on a smaller area of disturbance than for the proposed action.

4.8 Cumulative Effects

This EIS addresses the impacts associated only with the proposed expansion of the Black Pine Mine and alternatives, which would become part of BPMI's approved Plan of Operations. This document does not address any other features of the mining project as a whole. However, the proposed mine expansion would affect or could be affected by other projects. The primary actions that fall into this category are the existing mining project, plans to cleanup the historic tailings on the mine site, and the Forest Service's plans to harvest timber on the western portion of the Black Pine Range. In addition, the Idaho Transportation Department may use waste rock from the mine for reconstruction work on I-84. No other past, present, or reasonably foreseeable projects are known or discussed in this cumulative impacts section. While numerous historic mining projects have occurred in the study area, the passage of time since they ceased operations means that their effects are considered part of the existing environment. An exception to this is the cleanup of historic tailings.

The current mining and mine expansion are closely associated so potential impacts would affect the same vegetative and wildlife communities, soil types, surface drainages, air basin, visual resources, and grazing lessees. The proposed action would be reclaimed and revegetated as an integral part of the overall mining operation. The approved mine plan is expected to disturb 350 acres for pits, dumps, roads, leach pads and processing facilities. The mine expansion would disturb an additional maximum of 254.7 acres, which represents a 72 percent increase in disturbed surface area for both projects. Of the cumulative acreage (605), approximately 310 would be reclaimed. Various other mitigation measures identified for the mining project would also be applied to

the mine expansion, as discussed earlier in this chapter.

Of the proposed 255 acres of disturbance, approximately 206 acres would have some degree of visibility to travelers on I-84. This represents a 59 percent addition to the 350 acres of existing disturbance which are also visible from the highway.

The expansion project would cause the loss of an average of 150 habitat units (HUs): about 47 for mule deer, 13 for blue grouse, 33 for sage grouse, 18 for Brewer's sparrow, and 39 for the Towhee. The existing mining project has already removed a number of habitat units: 27 for sage grouse, 79 for blue grouse, 22 for mule deer, 15 for Brewer's sparrow, and 36 for the Towhee. Cumulatively, the HU losses amount to 11 percent of the available HUs for sage grouse, 39 percent of available HUs for blue grouse, 23 percent of available HUs for mule deer, 8 percent of available HUs for Brewer's sparrow, and 15 percent for the Towhee. The loss of a habitat unit does not automatically mean the loss of wildlife. The available HUs referred to here are in the study area surrounding the mine site. Certain forms of displaced wildlife could possibly relocate into adjacent, similar habitat beyond this area, if that habitat is not presently at its carrying capacity. Some forms of wildlife would not be able to relocate, either because suitable habitat does not exist elsewhere, or distances to relocate would be too great.

The amount of disturbed areas would increase by 72 percent. However, the potential impacts to other resources not directly tied to surface resources would not increase proportionately. Many of the impacts to these resources have already occurred and would not increase in magnitude in proportion with the additional disturbance areas. Examples of this include the fact that no additional water consumption is proposed, no significant additional grazing AUMs would be lost because the area is already closed to grazing, no additional cultural resources would be affected as indicated by site surveys, and no additional employment would mean essentially no change to the socioeconomic environment.

A plan is currently being evaluated under NEPA for the cleanup of historic tailings that occur on the mine site. Alternative 3 of the proposed expansion project could be influenced by this tailings project in the area of the C/D pit and C/D waste dump. Access to the C/D pit across the Tallman Waste Dump could be affected by potential use of the Tallman waste rock to cover the tailings. Also, waste rock from the C/D pit could be used to cover the historic tailings particularly in the area of the Alternative 3 C/D Waste Rock Dump.

In addition, the Forest Service is planning to harvest timber predominantly on the west side of the Black Pine Range. This project would treat trees in need of salvage due to Douglas-fir beetle mortality. The salvage area covers about 1500 acres dispersed across several square miles

including some areas immediately north and west of the Black Pine Mine. This project would involve harvesting timber by tractor and helicopter and the use of some prescribed burning. It would not utilize any access through the mine area. Some small areas of harvest would occur in areas that could be visible from the highway but they are not expected to be noticeable.

Mineral exploration activities would be continued by BPMI in the vicinity of the Black Pine Mine within the area approved in the 1989 Exploration Environmental Assessment (EA). This area covers approximately 10,900 acres. Exploration activities may include regional or local stream-sediment geochemistry sampling, soils sampling, rock chip sampling, airborne or ground based geophysics, field mapping and exploration drilling. Exploration activities would be conducted using the mitigation measures identified in 1989 EA to minimize environmental impacts. All exploration roads and drill pads would be reclaimed as soon as practical, following geologic evaluation, and would not exceed the approved road limits.

It is difficult to predict future mineral activities due to changes in technology and economics, including world economics. Future mining could take place in and around the Black Pine project including adjacent areas on the Black Pine Division. Any future mining proposals would be analyzed separately through the NEPA process.

The Idaho Transportation Department has recently indicated that they may be interested in acquiring waste rock from the Black Pine Mine for their upcoming reconstruction of I-84 from the Juniper rest area to the Utah state line. The waste rock would be used as ballast over the subgrade and 350,000 to 550,000 cubic yards would be required for this project. This project is programmed for 1996. Depending on its actual implementation schedule, the implementation of this use of project waste rock could reduce the volume of waste rock that is placed in proposed waste dumps. If this occurred, it could in turn reduce the amount of acreage disturbed by waste rock disposal. This would be evaluated in the environmental analysis of the highway reconstruction project.

Chapter 5

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5.0 Preparers and Contributors

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Chapter 6

List of Agencies, Organizations, and Persons to Whom the Scoping Statement Was Sent

6.0 List of Agencies, Organizations, and Persons to Whom the Scoping Statement Was Sent

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Chapter 7

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Chapter 8

Glossary

8.0 Glossary

Access Road: All roads, exclusive of haul and light-use roads, utilized for transportation of personnel, equipment, and small payloads of material within the permit boundary.

Acid Mine Drainage: Mine water which contains free sulfuric acid, mainly due to the weathering of iron pyrites. Where sulfide minerals break down under chemical influence of oxygen and water, the mine drainage becomes acidic.

Alternative: A proposition or situation offering a choice between two or more proposals, only one of which may be chosen. An opportunity for deciding between two or more courses or propositions. Under NEPA, alternatives to the proposed action must be examined in an EIS. The discussion of alternatives must "sharply [define] the issues and [provide] a clear basis for choice... by the decision-maker and the public." (40 CFR 1502.14).

Ambient: The environment as it exists at the point of measurement and against which changes or impacts are measured.

Aquifer: A zone, stratum, or group of strata acting as a hydraulic unit that stores or transmits water in sufficient quantities for beneficial use.

Aspect: The direction toward which a slope faces.

Background Distance Zone: The distant part of a landscape, picture, etc.; surroundings especially those behind something and providing harmony or contrast; surrounding area or surface. Area located from three to five miles to infinity from the viewer.

Best Management Practices (BMP): A method, activity, maintenance procedure, or other management practice for reducing the amount of pollution entering a water body. The term originated from the rules and regulations developed pursuant to Section 208 of the Clean Water Act (40 CFR 130).

Big Game: Large animals hunted, or potentially hunted, for sport.

Biota: All of the living material in a given area. Can include animals, vegetation, other organisms.

Character Type: Large physiographic area of land which has common characteristics of landforms, rock formations, water forms, and vegetative patterns.

Council on Environmental Quality (CEQ): An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cumulative Effects: The combined environmental impacts that accrue over time and space from a series of similar or related individual actions, contaminants, or projects. Although each action may seem to have a negligible impact, the combined effect can be severe. They include activities of the past, present, and foreseeable future.

Cyanide: see Sodium Cyanide and Total Cyanide and WAD Cyanide.

Decibel: A unit used in expressing ratios of electric or acoustic power. The relative loudness of sound. When decibels are measured on the A-weighted scale (dBA), they become units for expressing the relative intensity of sound (decibel or dBA), weighted with audible frequencies approximating the response of the human ear.

Direct Impacts: Impacts which are caused by the proposed action and occur at the same time and place. (40 CFR 1508.7). Synonymous with direct effects.

Discharge: The volume of water flowing past a point per unit time, commonly expressed as cubic feet per second (cfs), gallons per minute (gpm), or million gallons per day (mgd).

Distance Zone: Areas of landscapes denoted by specified distances from the observer. Used as a frame of reference in which to discuss landscape characteristics or activities of man (foreground, middleground, background).

Draft Environmental Impact Statement (DEIS): The statement of environmental effects which is required for major Federal actions under Section 102 of the National Environmental Policy Act and in regulations at 40 CFR 1500. The document is released to the public and other agencies for comment and review.

Drainage Basin: The area from which a given stream and its tributaries receive their water.

Earthquake: Sudden movement of the earth resulting from faulting, volcanism, or other mechanisms within the earth's crust.

Endangered Species: Any species of plant or animal that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

Environmental Impact Statement (EIS): A document that discusses the likely significant impacts of a proposal, methods to lessen the impacts and alternatives to the proposal. This documentation is required by the National Environmental Policy Act (Section 102(2)(C) and codified at 40 CFR 1508.11.

Epicenter: The part of the earth's surface directly above the focus or origin of an earthquake.

Erosion: Wearing away of rock or soils by the gradual detachment of soil or rock fragments by wind, water, ice, or other mechanical and chemical forces.

Exploration: The search for economic deposits of minerals, ore, and other materials through practices of geology, geochemistry, geophysics, drilling, and/or mapping.

Fault: A displacement of rock along a shear surface.

Floodplain: An area adjacent to a lake, ocean, or other body of water lying outside of the ordinary banks of the water body and periodically inundated by flood flows.

Foreground Distance Zone: the detailed landscape found within zero to one-quarter to one-half mile from the observer.

Forest Plan: Each of the National Forests administered by the USDA-Forest Service is operated under a five-year "Land and Resource Management Plan" as required by the National Forest Management Act of 1976. The 1976 Act was an amendment to the Multiple Use Sustained Yield Act of 1960 and the Forest and Rangeland Renewable Resources Planning Act of 1974. Forest Plans are prepared under the authority of these acts.

Free Cyanide: those molecules existing as cyanide ions and molecular hydrogen cyanides, and are free to complex with other elements.

French Drain: A water passage made by filling a trench or foundation area with loose stones or rock and covering with earth or other materials.

Fugitive Dust: Dust particles suspended randomly in the air from road travel, excavation, and rock loading operations.

Geochemistry: The chemistry of the earth, broadly defined as including all parts of geology that involve chemical changes.

Geotechnical: A branch of engineering that is essentially concerned with the engineering design aspects of slope stability, settlement, earth pressures, bearing capacity, seepage control, and erosion.

Grade: A slope stated as so many feet per mile or as feet per feet (percent); the content of precious metals per volume of rock (ounces per ton).

Groundwater: All subsurface water, especially that part that is in the zone of saturation.

Groundwater Discharge: The movement (usually laterally or upward) of water from a groundwater body to its emergence into a surface water system such as a spring, seep, or stream channel.

Groundwater Recharge: When water recharge to underlying materials or groundwater, deep or shallow, exceeds groundwater discharge to the surface on a net annual basis, and/or the rate of recharge typically exceeds the rate of discharge from terrestrial environments.

Habitat: The place or type of site where a plant or animal naturally or normally lives and grows. Includes all biotic, climatic, and soils conditions, or other environmental influences affecting living conditions.

Haul Road: All roads utilized for the transport of an extracted mineral, waste, overburden, or other earthen materials.

Headwater Stream: A stream with average annual flow less than five cubic feet per second.

Heap Leach: The process of leaching an ore that has been mined and systematically placed into a heap on a specially prepared pad. A dilute sodium cyanide solution is then applied through low-volume emitters and subsequently collection of the metal-bearing leachate solution which has percolated downward through the heap.

Heavy Metals: A group of elements occurring in the earth's crust in trace amounts, that are often toxic when acquired by organisms in higher concentrations. Includes copper (Cu), lead (Pb), mercury (Hg), molybdenum (Mo), nickel (Ni), cobalt (Co), chromium (Cr), iron (Fe), silver (Ag), and others.

Hydrology: A science dealing with the properties, distribution, and circulation of water.

Impoundment: The accumulation of water or water-based mixtures in a reservoir or other storage area.

Indirect Impacts: Impacts which are caused by the proposed action but are later in time or farther removed in distance, but are still reasonably foreseeable. (40 CFR 1508.8). Synonymous with indirect effects.

Infiltration: The movement of water or other liquids into the soil or rock through pores or other openings.

Intermittent Stream: A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas.

Irreversible: Applies primarily to the use of nonrenewable resources, such as minerals, cultural resources, wetlands, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Jurisdictional Wetland: A wetland area identified and delineated by specific technical criteria, field indicators, and other information for purposes of public agency jurisdiction. The public agencies which administer jurisdictional wetlands are the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and USDA-Soil Conservation Service.

Landform: Each of the numerous features that together make up the surface of the earth. It includes all broad features such as plains, plateaus, and mountains, and also all of the minor features, such as hills, valley, slopes, canyons, arroyos, and alluvial fans.

Land Use: The way the land is used in terms of the types of activities allowed (e.g. mining, agriculture, timber production, residences, industry) and the size of buildings and structures permitted. Certain types of pollution are often associated with particular land uses, such as sedimentation from construction activities.

Leaching: The process of applying a sodium cyanide solution to gold bearing ore. The gold complexes or binds to the solution, which is then called a "pregnant" solution. The pregnant solution is collected for processing to recover the gold.

Long-Term Impacts: Impacts that result in permanent or near-permanent changes to the environment.

Middleground Distance Zone: The space between the foreground and the background of a landscape. The area located from less than a mile to three to five miles from the viewer.

Mining Claims: That portion of the public estate held for mining purposes in which the right of exclusive possession of locatable mineral deposits is vested in the locator of the deposit.

Mitigate, Mitigation: To cause to become less severe or harmful, to reduce impacts. Actions to avoid, minimize, rectify, reduce or eliminate, and compensate for impacts to environmental resources.

Modification: A visual quality objective meaning man's activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Monitor: To systematically and repeatedly measure conditions in order to track changes.

Multiple Use: The management concepts under which National Forest System lands are managed. It involves the management of resources in combinations that will best serve the public.

National Register of Historic Places: A list, maintained by the National Park Service, of areas which have been designated as being of historical significance.

Native Species: Plants that originated in the area in which they are found, i.e. they naturally occur in that area.

NEPA: The National Environmental Policy Act of 1969. It is the national charter for protection of the environment. NEPA establishes policy, sets goals, and provides means for carrying out the policy. Regulations at 40 CFR 1500-1508 implement the act.

Nutrients: Essential chemicals needed by plants or animals for growth and health. If other physical and chemical conditions are optimal, excessive amounts of nutrients can lead to degradation of water quality by promoting excessive growth, accumulation and subsequent decay of plants, especially algae. Some nutrients can be toxic to animals in high concentrations.

Ore: Any deposit of rock from which a valuable mineral can be economically extracted.

Organic Administration Act of 1897: Act which provides the authority for the Forest Service to administer reserved and outstanding mineral operations in conjunction with the Secretary of Agriculture. The law specifically authorizes the USDA-Forest Service to manage the surface resources on National Forest System lands. It also provides a) the right to conduct mining activities, and b) the right of ingress and egress on National Forest System lands to conduct mineral activity.

Overburden: Material which overlies a deposit of valuable mineralization.

Overstory: That portion of the trees, in a forest of more than one story, forming the upper or uppermost canopy.

Partial Retention: A visual quality objective which generally means man's activities may be evident, but must remain subordinate to the characteristic landscape.

Patent: A document conveying title to land from the U.S. Government to private ownership.

Patented Claims: Private land which has been secured from the U.S. Government by compliance with laws relating to such lands.

pH: Symbol for the negative common logarithm of the effective hydrogen-ion concentration (acidity) of a solution. The pH scale runs from 0 to 14, with a pH of 7 considered neutral. A pH number below 7 indicates acid conditions and a pH value above 7 indicates alkaline or basic conditions.

Plan of Operations: Submitted by the mining operator, the plan of operations outlines the steps the mining company will take to mine and rehabilitate the site. The plan of operations is submitted prior to starting mining operations, and contains considerable details regarding mitigation measures identified in the EIS document.

Precious Metal: Any of the less common and highly valuable metals: gold, silver, platinum.

Pregnant Solution: The solution resulting from the leaching process which contains dissolved metal values.

Preservation: A visual quality objective that provides for ecological change only.

Productivity: In reference to vegetation, productivity is the measure of live and dead accumulated plant materials. It is used to assess revegetation success.

Project Alternatives: Alternatives to the proposed Project developed through the NEPA process.

Proposed Project: The Project proposed by the applicant, Black Pine Mining, Inc.

Reclamation: Returning disturbed land to a form and productivity that will be ecologically balanced and in conformity with a predetermined land-management plan.

Record of Decision (ROD): A document separate from but associated with an Environmental Impact Statement that publicly and officially discloses the responsible official's decision on which alternative assessed in the Environmental Impact Statement to implement.

Retention: A visual quality objective which, generally means man's activities should not be evident to the casual forest visitor.

Riparian: Relating to, living in, or located on the bank of a natural watercourse such as a stream or river.

Runoff: Precipitation that is not retained on the site where it falls and is not absorbed by the soil. Natural drainage away from an area.

Scoping Process: Scoping is an early and open process for determining the scope of issues and concerns to be addressed and for identifying the significant issues related to a proposed action. (40 CFR 1501.7).

Sediment: Material suspended in or settling to the bottom of a liquid. Sediment input comes from natural sources, such as soil erosion, rock weathering, or anthropogenic sources, such as forest or agricultural practices, or construction activities.

Seismicity: The likelihood of an area being subject to earthquakes. The phenomenon of earth movement from seismic activity.

Sensitivity Level: A particular degree or measure of viewer interest in the scenic qualities of the landscape.

> **Sensitivity Level 1** - The highest sensitivity level, referring to areas seen from travel routes and areas with moderate to high use.
>
> **Sensitivity Level 2** - An average sensitivity level, referring to areas seen from travel routes and areas with low to moderate use.

Settling Ponds: Structures constructed by excavation and/or by building an embankment, which may be lined, whose purpose is to retain water and allow for settlement of suspended solids and reduction in turbidity.

Short-Term Impacts: Impacts occurring during project construction and operation, and ceasing upon project closure and reclamation.

Significant Issues: Of all the issues and concerns raised during the scoping process for an EIS, certain of those issues are determined to be significant by the lead public agency. Determining which issues are significant, and thus meriting detailed study in the EIS, is the final step of the scoping process and varies with each project and location.

Sodium Cyanide: The cyanide used to extract gold and silver from low grade ore by creating an aqueous solution of sodium cyanide and oxygen which converts the metal to a soluble form.

Sulfide Minerals: Refers to minerals of geologic interest (precious meals) that contain compounds of sulfur.

Synthetic Liner: A protective layer made of man-made materials installed along the bottom, sides, and/or top of a disposal area to reduce migration of fluids and solids into or out of the disposal area.

Topsoil: The original or present dark-colored upper soil that ranges from a mere fraction of an inch or two or three feet thick on different kinds of soil. Most organic matter is concentrated in the topsoil.

Total Cyanide: Includes weak acid dissociable (WAD) cyanide, complex iron cyanides, and most other inorganic complex cyanides, except gold, cobalt, and some of the platinum metals.

Toxic: Poisonous, carcinogenic, or otherwise harmful to life.

Tributary: A stream that flows into a larger stream, river, or other water body.

Turbidity: A measure of the amount of material suspended and dissolved in the water. Increasing the turbidity of water decreases the amount of light that penetrates the water column. High turbidity levels can be harmful to aquatic resources.

Unavoidable Impacts: Many impacts which could occur from the Project can be eliminated or minimized by management requirements and constraints and mitigation measures. Impacts that cannot be eliminated are identified as unavoidable. Synonymous with unavoidable effects.

Understory: A foliage layer lying beneath and shaded by the main canopy of vegetation in a forest or shrub community.

Variety Class: A particular level of visual variety or diversity of landscape character. There are three variety classes. The project area is categorized into only one variety class; Class B.

> **Class A -** Distinctive; areas with strongly defined features, striking form or color, unusual configuration of landforms or combinations of features.

Class B - Common; refers to those areas where features contain variety in form, line, color and/or texture, but to a degree that tends to be common throughout the character type. The features are not outstanding in visual quality.

Class C - Minimal; areas having little or no variation in landforms, extensive areas of similar vegetation, limited texture or color variation, small features lost in the overall landscape.

Visual Quality Objective (VQO): A desired level of visual quality based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape.

Visual Resource: The composite of basic terrain, geologic features, water features, vegetation patterns, and land use effects that typify a land unit and influence the visual appeal the unity may have for viewers.

Waste Dump: Location and/or destination of waste, spoil, or overburden material during the mining operation but does not include the marketable mineral, subsoil and topsoil.

Waste Rock: Non-ore rock including overburden that is extracted to gain access to the ore zone. It contains precious metals below the economic cutoff level, and must be removed to recover the ore.

Watershed: The geographic region from which water drains into a particular stream, river or body of water and referred to as drainage basins. A watershed includes hills, lowlands, and the body of water into which the land drains. Watershed boundaries are defined by the ridges separating watersheds and referred to as drainage basins.

Wetlands: Areas that are inundated by surface or groundwater with a frequency sufficient to support and, under normal circumstances, does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Appendices

Appendix A

Post-Mining Objectives Identified by the Forest Service

Operation and Post-Mining Land Use Objectives

Range

Return land to 90% of present carrying capacity and where possible enhance grazing resource by use of water from wells drilled in the area.

Wildlife

Mule Deer

Maintain or enhance acres for early green up values, fall and spring for intermediate deer winter range.

1. Forbs and grass for spring and fall green up.

2. Shrubs for cover and feed.

Sage and Sharp-Tailed Grouse

Restore nesting habitat and feed for broods.

Bluegrouse

1. Restore nesting habitat and feed for broods.

2. Protect summer habitat (conifer) in Mineral Gulch.

Ferruginous Hawk

Protect or re-establish hawk nest sites in juniper habitat.

Visuals

1. Meet forest plan VQOs which include:

    (a) Modification and partial retention.

(b) Project site rehabilitation to proceed in accordance with progression of mining operation.

(c) Final restoration would be complete within the prescribed time frames for VQOs as established in the Forest and Reclamation Plans.

2. Landform:

   Shape to blend with natural terrain where it will not adversely affect other resource objectives.

   (a) dumps
   (b) pits
   (c) road
   (d) heap leach pad

3. On both Forest Service and BLM:

   Impacts of the project will be assessed by the viewers recognition of contrasts, and incongruent land forms. These contrasts will be reduced to an acceptable level.

Watershed

1. Minimize surface erosion during and after mining.

2. Maintain existing waterways to pass storm drainage. (This may require re-routing.)

3. Revegetate disturbed sites with a good vegetative mix.

4. Return ground cover to 75% of like vegetation.

Recreation

1. Maintain dispersed recreation values as prescribed in the Forest Land and Resource Management Plan for:

   - Hunting
   - Access
   - Off Highway Vehicle (OHV)

Appendix B

Biological Evaluation

BIOLOGICAL EVALUATION

BLACK PINE MINE EXPANSION PROJECT

USDA FOREST SERVICE
SAWTOOTH NATIONAL FOREST

September 1993

Introduction

Project Description

Black Pine Mining Incorporated's (BPMI) proposed modification to the Plan of Operations describes plans to mine three deposits from new pits, C/D Pit, E Pit, and J Pit. These pits and associated roads and dumps would disturb approximately 255 acres of Forest Service lands. Ore from these deposits would be processed at the existing facilities on lands currently permitted and operated by BPMI. A total of 9.8 million tons of ore would be mined over approximately three years. The development of the new pits would generate approximately 15.8 million tons of waste rock or overburden. This material would be partially backfilled in three pits and placed in one new waste dump. The new waste rock dump would impact approximately 33.8 acres of Forest Service lands. Construction and use of haul roads would be necessary to connect the mine areas and waste dumps to the currently permitted roadway network. New roads would impact approximately 44.4 acres. Construction activities may involve the clearing of vegetation, the stockpiling and protection of salvageable topsoil, grading, drilling, blasting, and hauling of material.

Methods

Information on the species covered by this evaluation was acquired from two primary sources. First, resource management agencies were contacted for information. This information involved the species' status and use of the project area. Second, published and unpublished literature was used to corroborate and supplement the information provided by the agencies. After the information was collected, the ecology, habitats, and distributions of each species were compared to project features to determine potential effects.

Affected Environment

Discussion of Species of the Proposed Project

This section presents the abundance, distribution, and ecology of the species under consideration in this evaluation. The descriptions focus on aspects of these parameters that the proposed project may affect. The discussion presented here is primarily based on literature and information conducted specifically for the project. Only common names are used in this report, but all animal and plant species referred to in this report are listed with their scientific names in the species list at the end of the report.

The U.S. Fish and Wildlife Service classifies both the ferruginous hawk and the Swainson's hawk as category two species. Although these species do not have any legal protection under the Endangered Species Act, they are considered sensitive due to trends in their populations that may lead to future listing. Therefore, these species have been evaluated to determine any potential effects from the proposed project that may lead to a downward trend in their populations.

Ferruginous Hawk

Habitat Requirements

Ferruginous hawks are typically associated with grassland, shrubland, and steppe-desert vegetation types in the western United States. In addition, ferruginous hawks are highly susceptible to human disturbances. Therefore, they are generally found in areas of these vegetation types away from human disturbance (Jasikoff 1982).

Ferruginous hawks are typically the most adaptable raptor in nest site selection (Call 1987). Therefore, nesting substrates may vary from isolated trees, cliffs, buttes, cutbanks, man-made structures, the ground, and trees within the juniper-sagebrush habitat type. Although all types may be utilized, the preference for nesting appears to be trees (Jasikoff 1982).

Preferred nest trees are junipers, pines, willows, cottonwoods, and sagebrush. Nests are generally 6 to 10 feet from the ground and near undisturbed prairie. However, ground nests in southern Idaho may be located near small hills (Jasikoff 1982).

Nesting for the ferruginous hawk generally begins the last of March through the first of April at which time egg laying begins. It is at this time that the birds are most susceptible to human disturbance. Hatching dates vary from the end of April to the first of June. Once the young have hatched the parental bond to the nest is greater and the chance of abandonment decreases.

Ferruginous hawks hunt by cruising several feet from the ground, over open fields. Prey species most often taken include jackrabbits. However, pocket gophers, Ord's kangaroo rats,

thirteen-lined ground squirrels, Richardson's ground squirrel, cottontails, antelope ground squirrels, deer mice, and small birds may be taken. The relationship between ferruginous hawks and jackrabbits appears to be closely linked. Some studies indicate that declines in jackrabbit numbers correlates closely with declining ferruginous hawk populations (Jasikoff 1982).

Distribution and Use of the Project Area

The ferruginous hawk is known to breed in the general Black Pine area (Stephens and Sturts 1991). However, ferruginous hawk populations appear to have declined in past years. The Burley District of the BLM has one of the densest concentrations of ferruginous hawks nests in Idaho. Many of these nests are located in the Juniper and Curlew Valleys (Bechard et al 1986). However, no active nests are known to occur in the area.

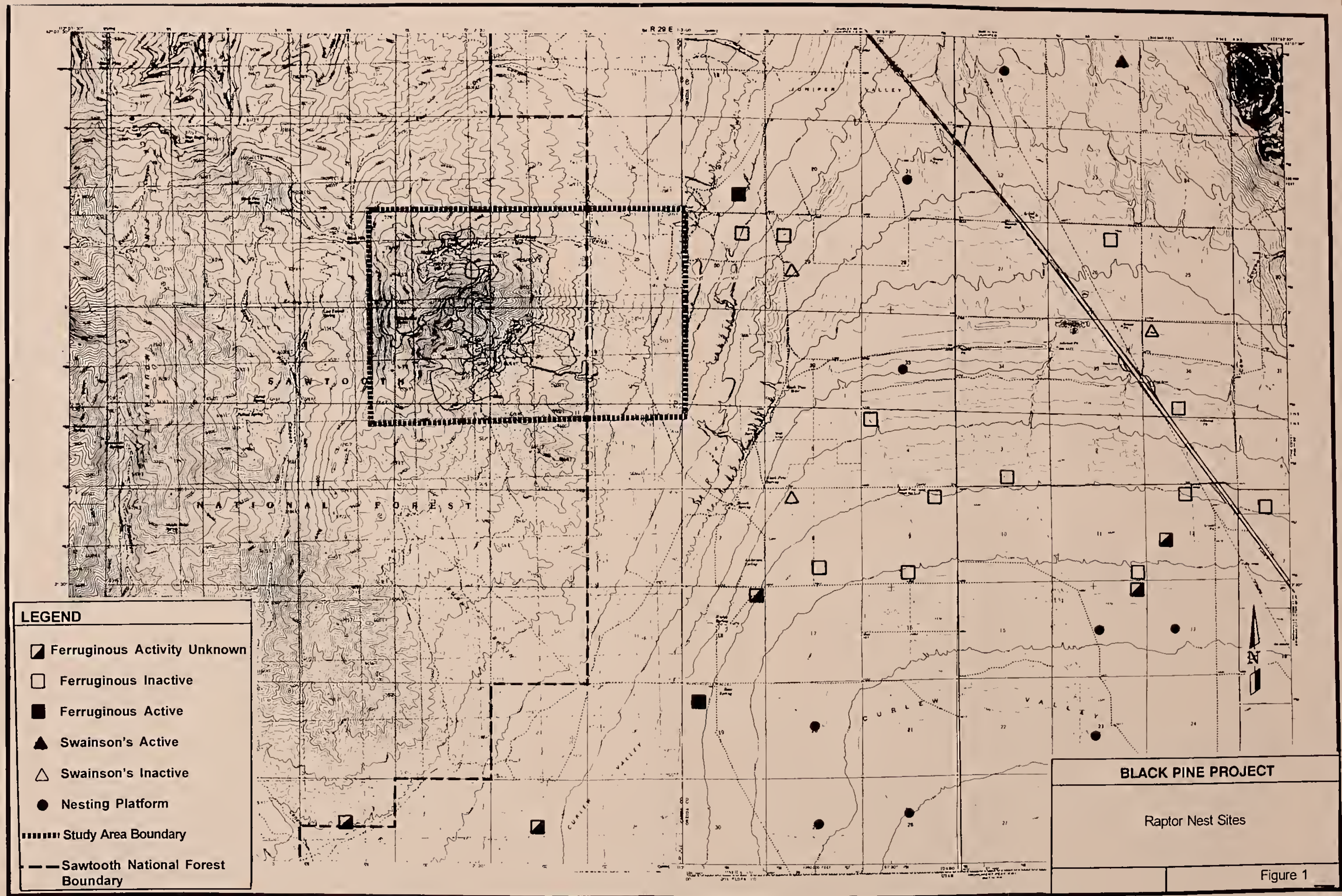
In 1987 there were at least two known active ferruginous hawk nests in Juniper Valley, with the possibility of an additional three used in the 1986 nesting season (**Figure 1**). In addition, there are fourteen previously active nests in Juniper Valley, as well as nine man-made nest structures. Currently the BLM is monitoring the nest sites and reports that no active nests occur within the proposed expansion area (Kumm 1992). However, the area within one mile of any ferruginous hawk nest has been designated as critical habitat.

In addition to the potential nesting habitat in the area, agencies have identified all of the Juniper Valley as important hunting habitat for the hawk.

Direct and Indirect Effects

Construction of the Black Pine Mine Expansion would affect the ferruginous hawk if habitat was removed or increased human activity adversely affected their behavior or mortality rates. Overall, the proposed project is not expected to substantially affect the ferruginous hawk.

The proposed project would remove or adversely impact a small amount of potential habitat. Approximately 255 acres of potential foraging habitat would be altered, and minor amounts of potential nesting habitat, as most nesting occurs at lower elevations. However, this is not expected to adversely impact the hawks. This conclusion is based on the following considerations. First, the habitat would be replaced after reclamation of the proposed project. Second, the lack of known nesting sites within the project area indicate that the hawks do not utilize the area for nesting. Lastly, although they may utilize the area for foraging, the high amount of human activity ongoing in the area probably limits the attractiveness of the area for the hawk. Therefore no adverse impacts to the hawk are anticipated.



BLACK PINE PROJECT

Raptor Nest Sites

Figure 1

Cumulative Impacts

Black Pine Mine's Proposed project is not expected to cause perceivable cumulative impacts on the ferruginous hawk. As described above, only minor amounts of ferruginous hawk habitat will be adversely impacted by the proposed project. In addition, no other projects are planned in the foreseeable future in the project area that would add to the project's effects. Although a proposed timber sale has been slated in the Black Pine Canyon northwest of the mine, timbered areas are not suitable habitat for the ferruginous hawk. Thus no practical potential exists for the effects of multiple projects to cumulatively affect the ferruginous hawk.

Swainson's Hawk

Habitat Requirements

Swainson's hawks are typically migratory through out the western United States. Swainson's are generally associated with riparian forests, brushy areas, and shelterbelts. However, they also utilize grasslands and agricultural areas for foraging (MDFWP 1987). In general Swainson's hawks typically are more tolerant to human disturbance than other raptors.

Swainson's hawk nests commonly construct nests in trees or tall bushes. However, they will occasionally nest on transmission line towers. Nests are generally flimsy when compared to other raptors' nests, and may resemble a flatten tumbleweed. In addition, the nests may be constructed close to the ground; some may be as close as four feet to the ground. The majority of nests are constructed in juniper trees or in isolated cottonwoods along dry stream beds (Call 1987).

Nesting periods for the hawk begins in May when one to three eggs are laid. Incubation lasts twenty-eight days, and the young generally fledge by late June.

In late September the Swainson's hawk migrates to South America. Also at this time individuals may join together to form large groups during migration.

Forging generally occurs over agricultural or grasslands. Primary prey species for the Swainson's hawk include ground squirrels, voles, pocket gophers, and occasionally small birds (Craighead and Craighead 1969). However, they have also been observed taking insects (MDFWP 1987).

Distribution and use of the Project Area

The Swainson's hawk is listed as a breeder within the general Black Pine area. However, no Swainson's nests have been located in the existing mine area.

A total of 22 Swainson's hawk nests have been located in the Burley District of the BLM. However, only two inactive Swainson's nests have been located in Juniper Valley. In general the population of the Swainson's hawk in the general Black Pine area, is much smaller than that of the ferruginous hawk. The BLM has been monitoring nests sites in the area, however, no active nests area located within four miles of the proposed mine expansion area (**Figure 1**). The only active nest in the general are is north of Interstate 84.

Direct and Indirect Effects

Construction of the Black Pine Expansion project would affect the Swainson's hawk if habitat was removed or increased human activity adversely affected their behavior or mortality rates. Overall the proposed project is not expected to substantially affect the Swainson's hawk.

The proposed project would remove or adversely impact a small amount of potential habitat. Approximately 255 acres of potential foraging and nesting habitat would be altered. However, this is not expected to adversely impact the hawks over the long-term. This conclusion is based on the following considerations. First, the habitat would be replaced after reclamation of the proposed project. Second, the lack of known nesting sites within the project area indicate the hawks probably do not utilize the area for nesting. Third, the Swainson's hawk populations are directly linked to the local jackrabbit population. In recent years, the jackrabbit population has been low due to drought conditions. It is not expected that Swainson's hawk populations would increase without an increase in the rabbit population independent of other habitat parameters. Therefore, no adverse impacts to the hawk are anticipated.

Cumulative Impacts

Black Pine Mine's Proposed project is not expected to cause perceivable cumulative impacts on the Swainson's hawk. This conclusion is principally based on two considerations. First, only minor amounts of Swainson's hawk habitat will be adversely impacted by the proposed project. In addition, no other projects are planned in the foreseeable future in the project area that would add to this project's effects. Although a proposed timber sale has been slated in the Black Pine Canyon northwest of the mine, timbered areas are not suitable habitat for the Swainson's hawk. Thus, no practical potential exists for the effects of multiple projects to cumulatively affect the Swainson's hawk.

Species List

Ferruginous Hawk	*Buteo regalis*
Swainson's Hawk	*Buteo swainsoni*
Jackrabbit	*Lepus spp.*
Cottontail	*Sylvilagus spp.*
Vole	*Clethrionomys spp.*
Deer Mouse	*Peromyscus maniculatus*
Pocket Gopher	*Thomomys spp.*
Ord's Kangaroo Rat	*Dipodomys ordi*
Thirteen-lined Ground Squirrel	*Citellus tridecemlineatus*
Richardson's Ground Squirrel	*Citellus richardsoni*
Antelope Squirrel	*Ammospermophilus spp.*
Juniper	*Juniperus spp.*
Cottonwood	*Populus spp.*
Sagebrush	*Artemisia spp.*
Pine	*Pinus spp.*
Willow	*Salix spp.*

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